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# TEST REPORT

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Report No.: SRTC2013-H024-E0001

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

Product Model: ZTE R239

Applicant: ZTE Corporation

Manufacturer: ZTE Corporation

Specification: FCC Part 24E, Part 22H, Part 2  
(April 25, 2013 edition)

FCC ID: SRQ-ZTER239

The State Radio\_monitoring\_center Testing Center (SRTC)

No.80 Beilishi Road Xicheng District Beijing, China

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

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## 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)  
Address: No.80 Beilishi Road, Xicheng District, Beijing China  
City: Beijing  
Country or Region: China  
Contacted person: Wang Junfeng  
Tel: +86 10 68009181 +86 10 68009202  
Fax: +86 10 68009195 +86 10 68009205  
Email: wangjf@srrc.org.cn / wangjunfeng@srtc.org.cn

### 1.3 Applicant's details

Company: ZTE Corporation  
Address: ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park,  
Nanshan District, 518057  
City: Shenzhen  
Country or Region: P.R.China  
Grantee Code: SRQ  
Contacted person: Min Zhang  
Tel: +86-021-68897541  
Fax: +86-021-50801070  
Email: zhang.min13@zte.com.cn

### 1.4 Manufacturer's details

Company: ZTE Corporation  
Address: Zhongxing Bldg, Hi-Tech Park, NanShan District, 518057  
City: Shenzhen  
Country or Region: P.R.China  
Contacted person: Li Dezi  
Tel: +86-021-68895196  
Fax: +86-021-50801070  
Email: li.dezi@zte.com.cn

## 1.5 Application details

Date of reception of test sample: 18<sup>th</sup> April 2013

Date of test: 30<sup>th</sup> April 2013 to 24<sup>th</sup> May 2013

## 1.6 Reference specification

FCC Part 24E, Part22H, Part 2 (April 25, 2013 edition)

## 1.7 Information of EUT

### 1.7.1 General information

Name of EUT	GSM/GPRS/EDGE Digital Mobile Phone with Bluetooth and WiFi
FCC ID	SRQ-ZTER239
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: GMSK(Uplink direction) 8PSK(Downlink direction)
Emission Designator	300KGXW
Duplex Mode	FDD
Duplex Spacing	GSM850:45MHz PCS1900:80MHz
Antenna Type	Fixed Internal
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	GMBA
SW Version	ZTE-CN-QS-P150A40V1.0.0

### 1.7.2 EUT details

Name	Model	IMEI
GSM/GPRS/EDGE Digital Mobile Phone with Bluetooth and WiFi	ZTE R239	355278040000237

### 1.7.3 Auxiliary equipment details

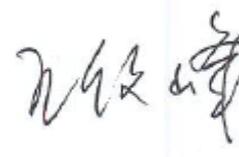
Equipment	Charger
Manufacturer	ZTE CORPORATION
Model Number	STC-A22O50I400M5-C
Input Voltage	100V-240V a.c.
Output Voltage	5.0V d.c.
Frequency	50/60Hz

Equipment	Battery
Manufacturer	ZTE CORPORATION
Model Number	Li3706T42P3h453756
Capacity	670mAh
Rated Voltage	3.7V d.c.

## 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 Radiated Power and Effective Isotropic Radiated Power	22.913(a)/24.232(c)	Pass
3	Occupied Bandwidth	2.1049	Pass
4	Emission Bandwidth	22.917(b)/24.238(b)	Pass
5	Spurious Emissions at antenna terminals	2.1051/22.917(a)/24.238(a)	Pass
6	Band Edges Compliance	2.1051/22.917(a)/24.238(a)	Pass
7	Frequency Stability	2.1055/22.355/24.235	Pass
8	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 Bin Test engineer 	Issued date:  <b>2013.06.26</b>

## 2.2 Test result

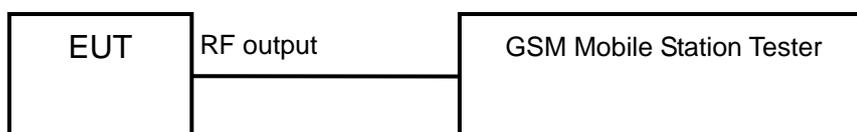
### 2.2.1 GSM850

#### 2.2.1.1 RF Power Output-FCC Part2.1046

Ambient condition:

Temperature	Relative humidity	Pressure
23℃	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
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Test result:

GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
824.2	128	32.4
836.4	189	32.3
848.8	251	32.3

EDGE (GMSK) MODE:

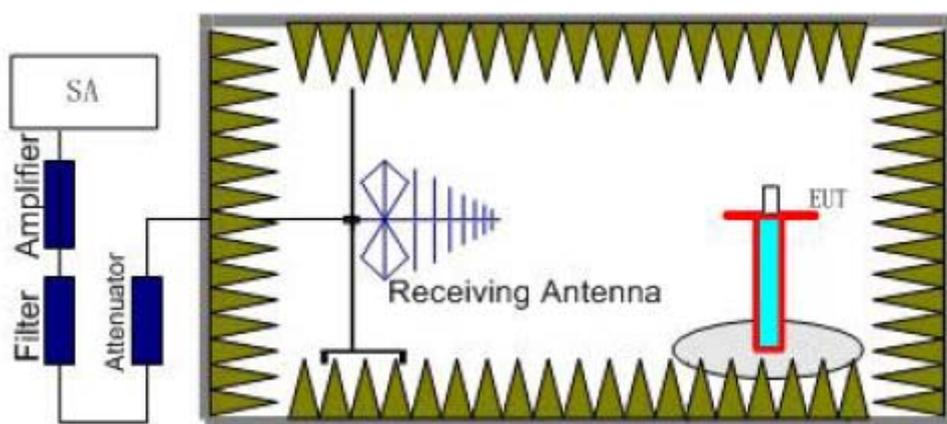
Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
824.2	128	32.4
836.4	189	32.4
848.8	251	32.3

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

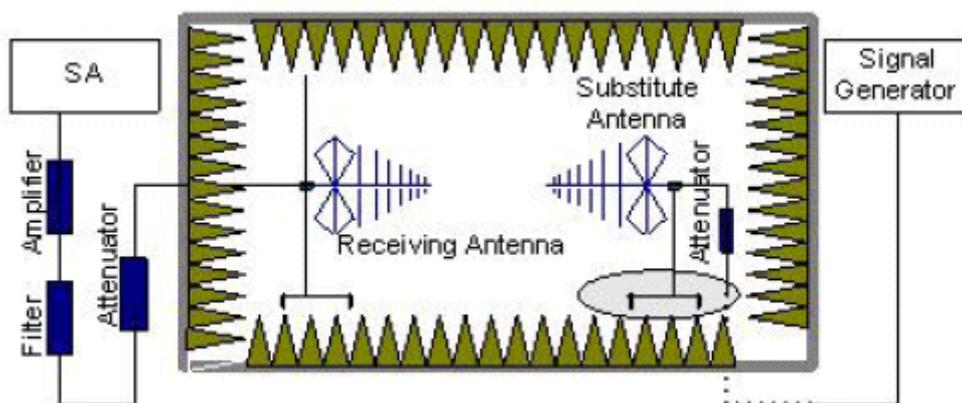
Ambient condition:

Temperature	Relative humidity	Pressure
26°C	43%	101.3kPa

Test setup:



Step 1



Step 2

Test procedure:

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 RMS 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.

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.

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

Limits	≤38.5dBm
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Test result:

GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	E.R.P. (dBm)
824.2	128	29.4
836.4	189	29.4
848.8	251	29.2

EDGE (GMSK) MODE:

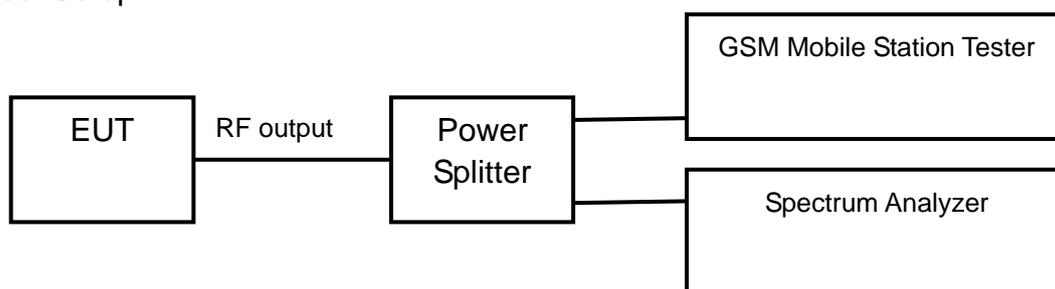
Carrier frequency (MHz)	Channel No.	E.R.P. (dBm)
824.2	128	29.2
836.4	189	29.4
848.8	251	29.2

### 2.2.1.3 Occupied Bandwidth-FCC Part2.1049

Ambient condition:

Temperature	Relative humidity	Pressure
23℃	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:

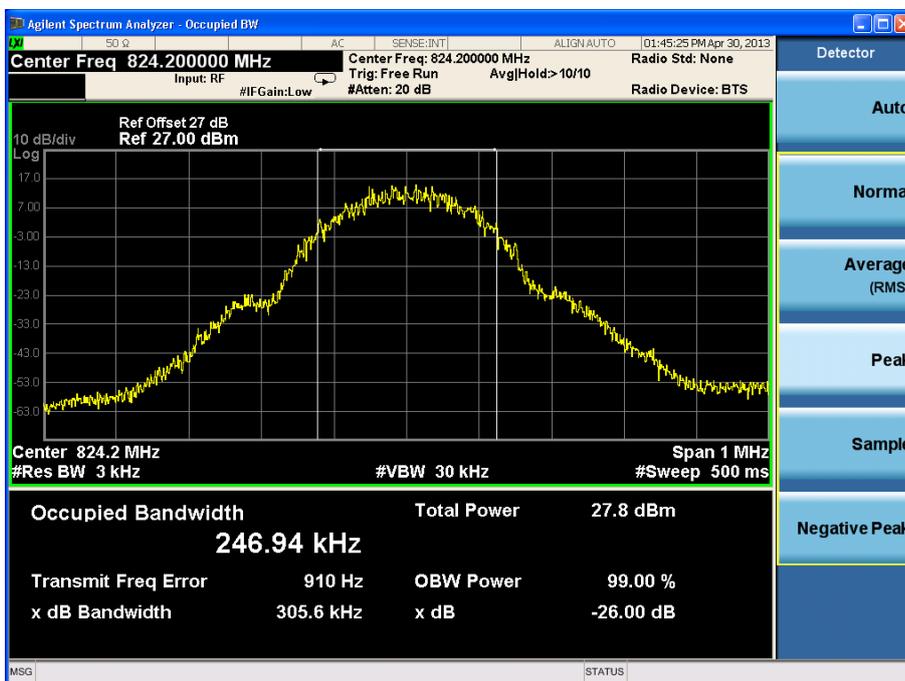
GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	246.94
836.4	189	248.28
848.8	251	248.04

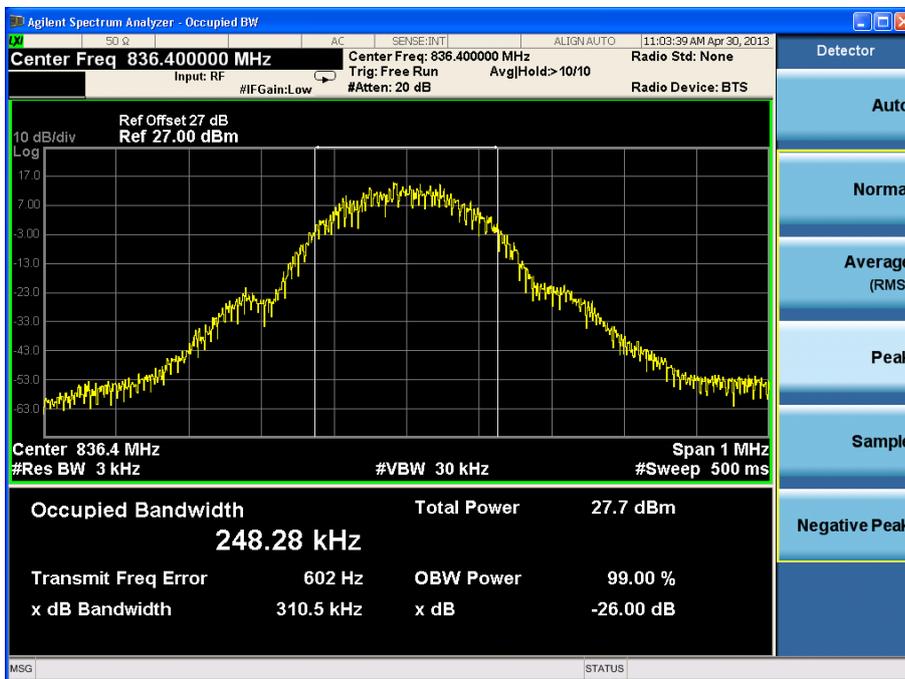
EDGE (GMSK) MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	245.65
836.4	189	243.12
848.8	251	244.35

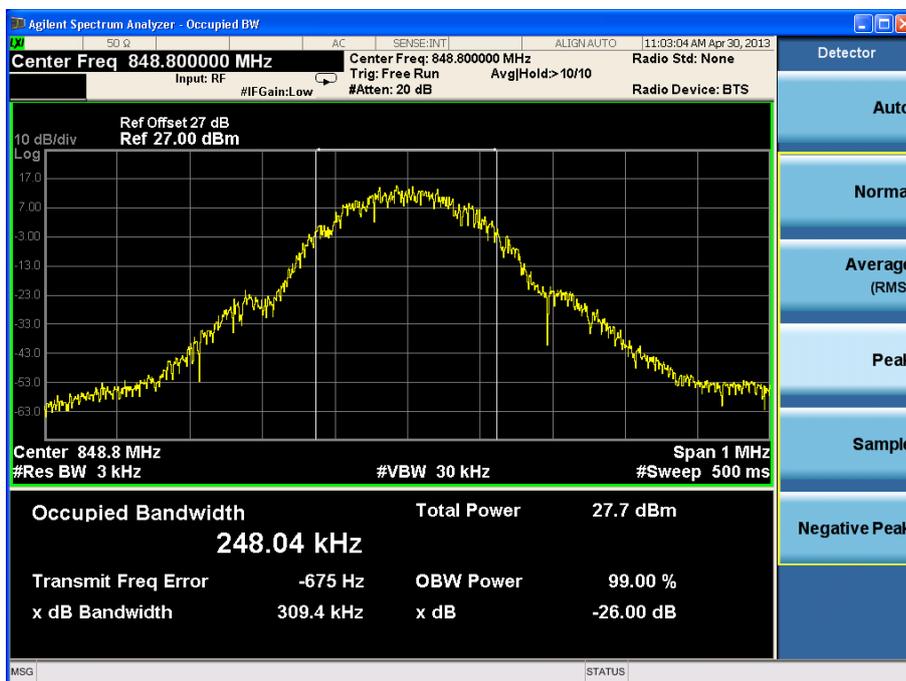
GSM/GPRS MODE:



Channel 128



Channel 189

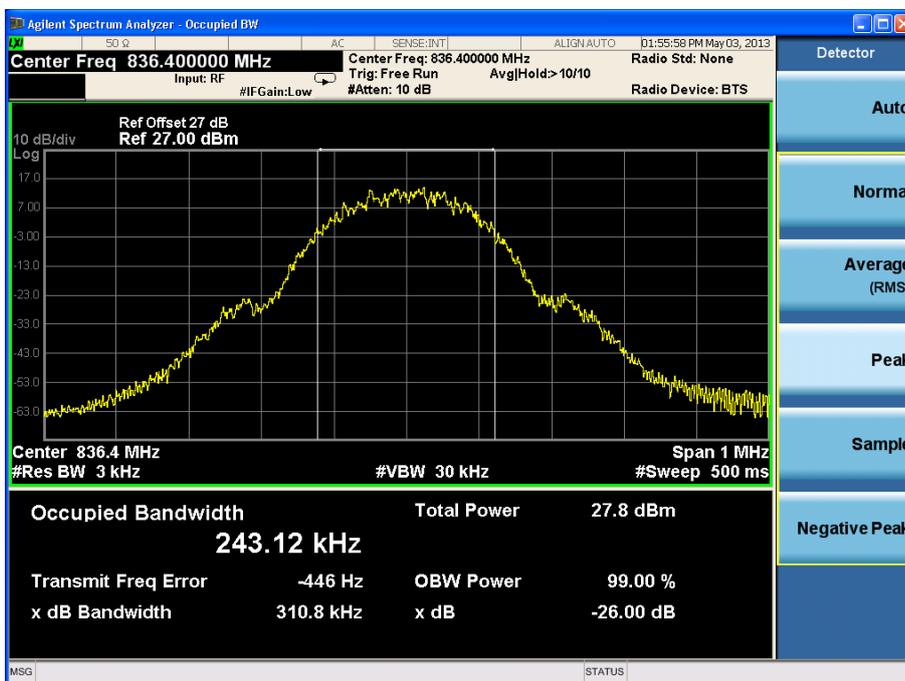


Channel 251

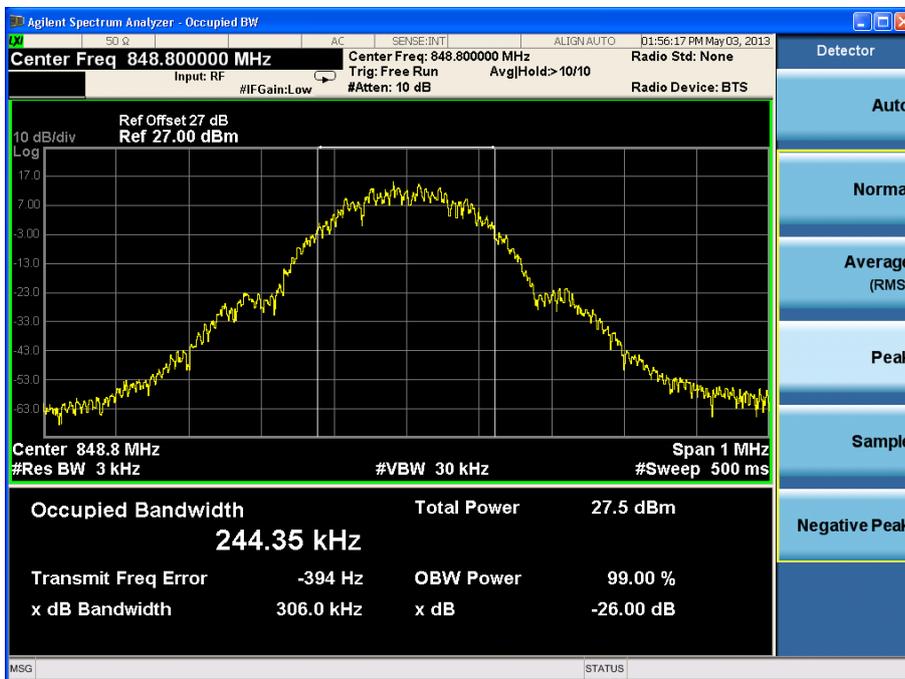
EDGE (GMSK) MODE:



Channel 128



Channel 189



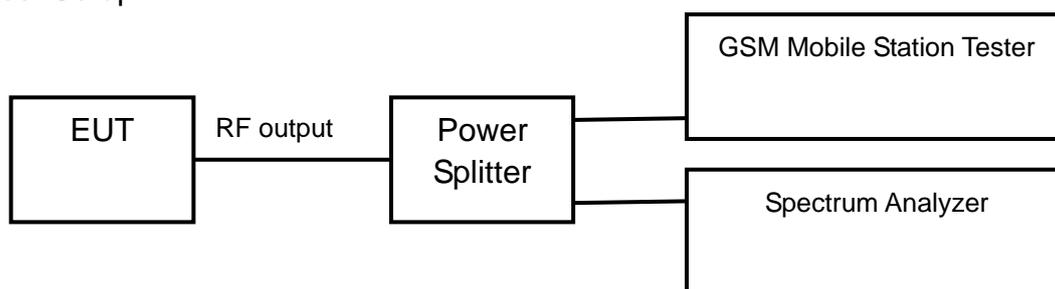
Channel 251

### 2.2.1.4 Emission Bandwidth-FCC Part22.917(b)

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 emission bandwidth is measured using spectrum analyzer. RBW is set to 3kHz on spectrum analyzer. The bandwidth of -26dB transmitter 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 emission bandwidth requirements in part 22.917(b)

Test result:

GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power (kHz)
824.2	128	314.8
836.4	189	310.5
848.8	251	309.4

EDGE (GMSK) MODE:

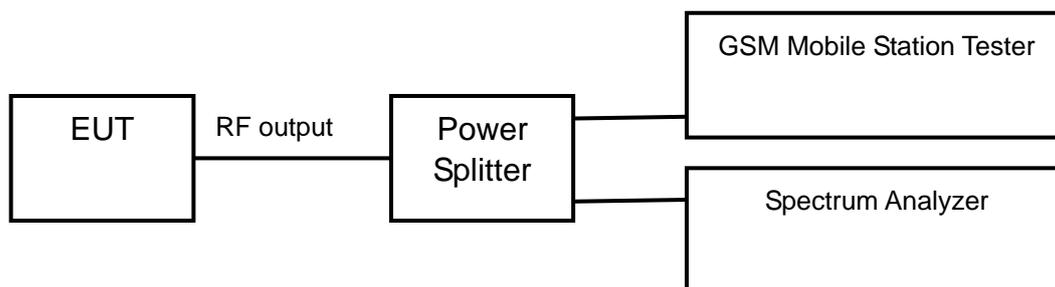
Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power (kHz)
824.2	128	310.5
836.4	189	310.8
848.8	251	306.0

### 2.2.1.5 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<sup>th</sup> harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer.

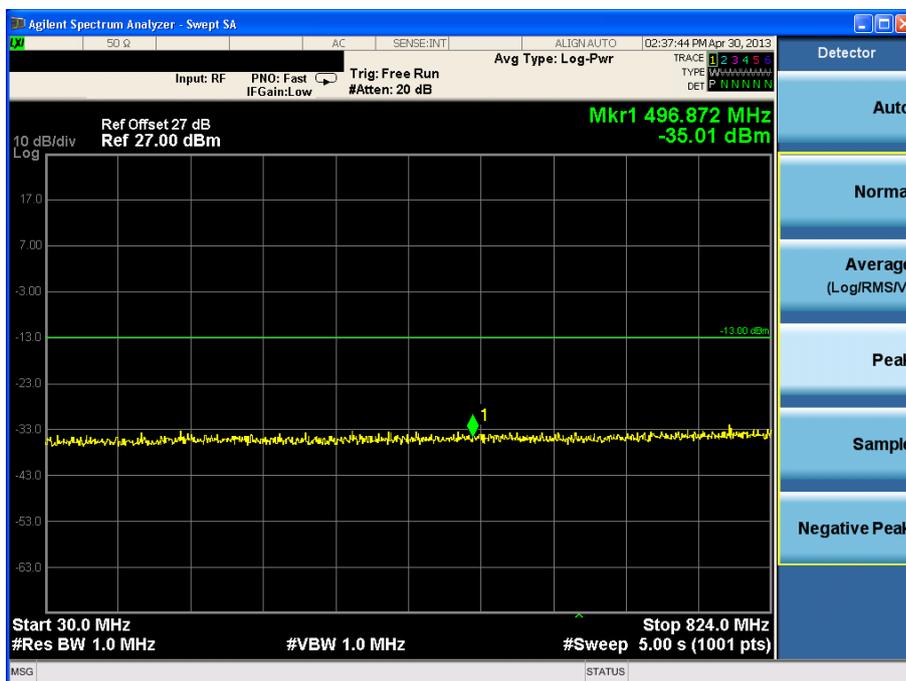
The measurement will be conducted at one channel No189 (middle channel of GSM850 band)

Limits	$\leq -13\text{dBm}$
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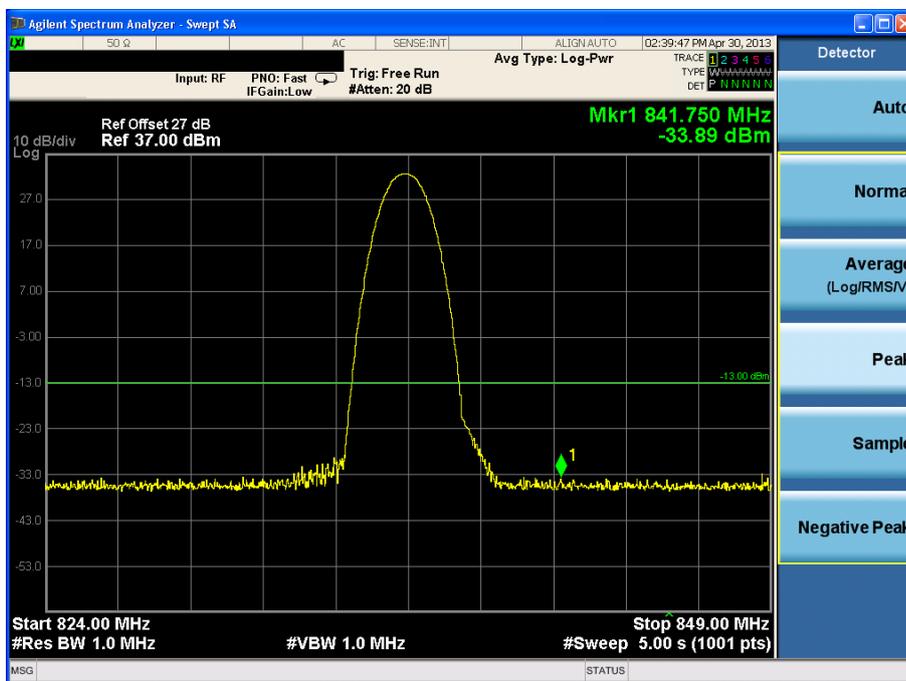
Test result:

Refer to the following figures.

GSM/GPRS MODE:

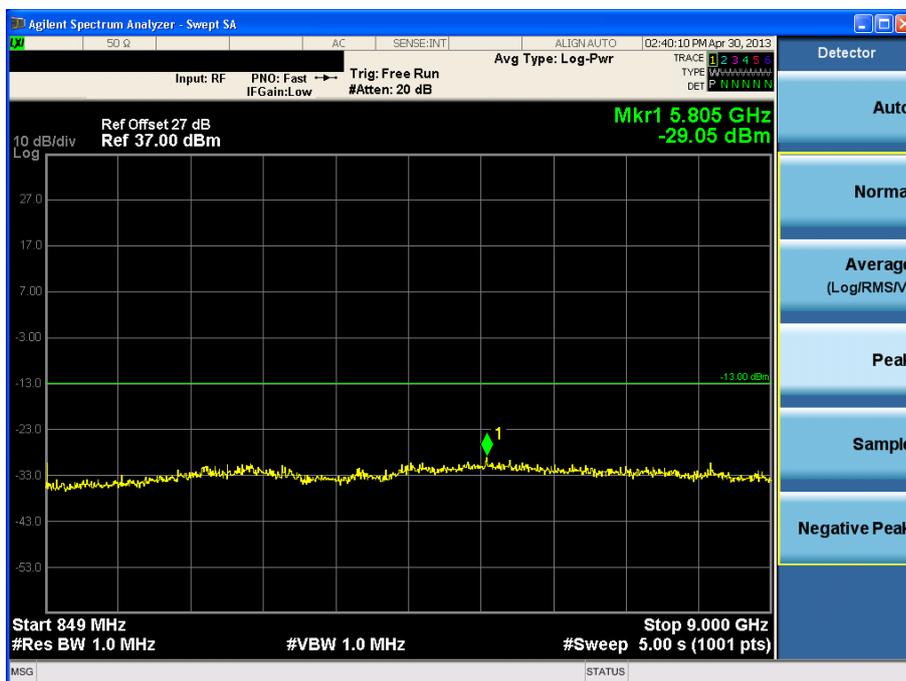


Channel 189, 30MHz~824MHz



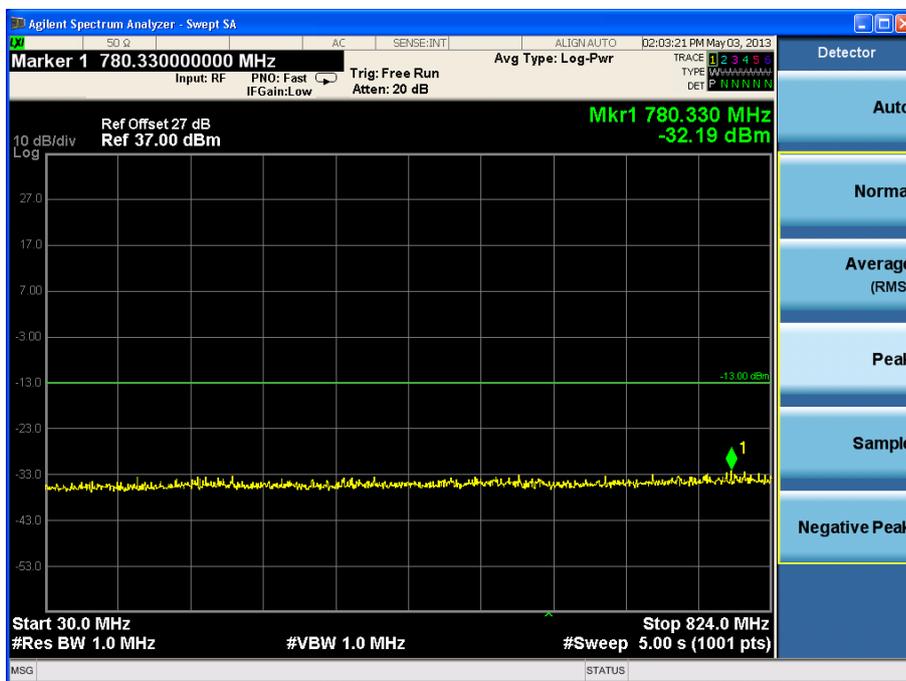
Channel 189, 824MHz~849MHz

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

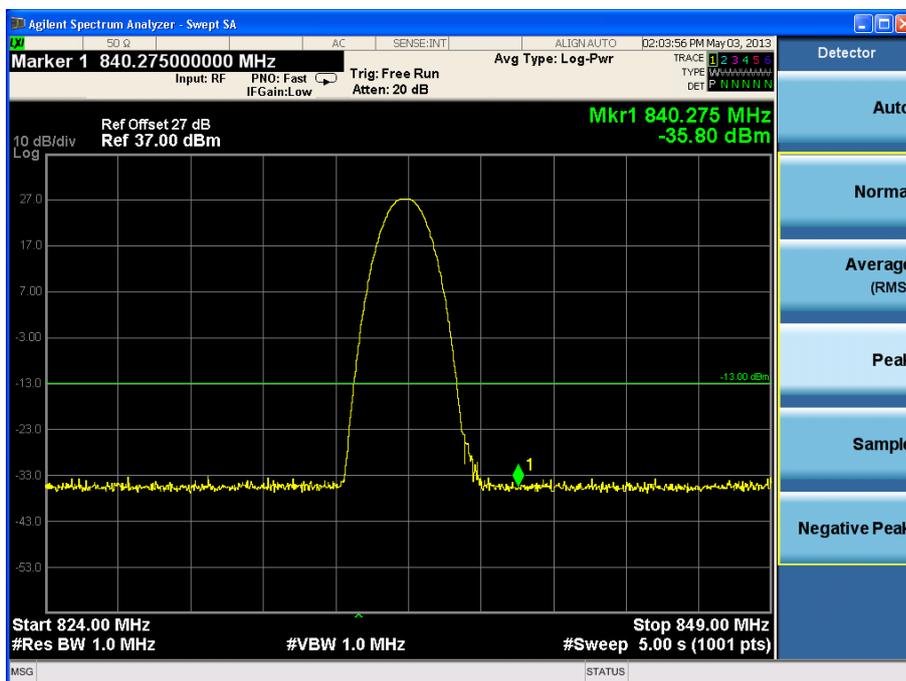


Channel 189, 849MHz~9GHz

EDGE (GMSK) MODE:

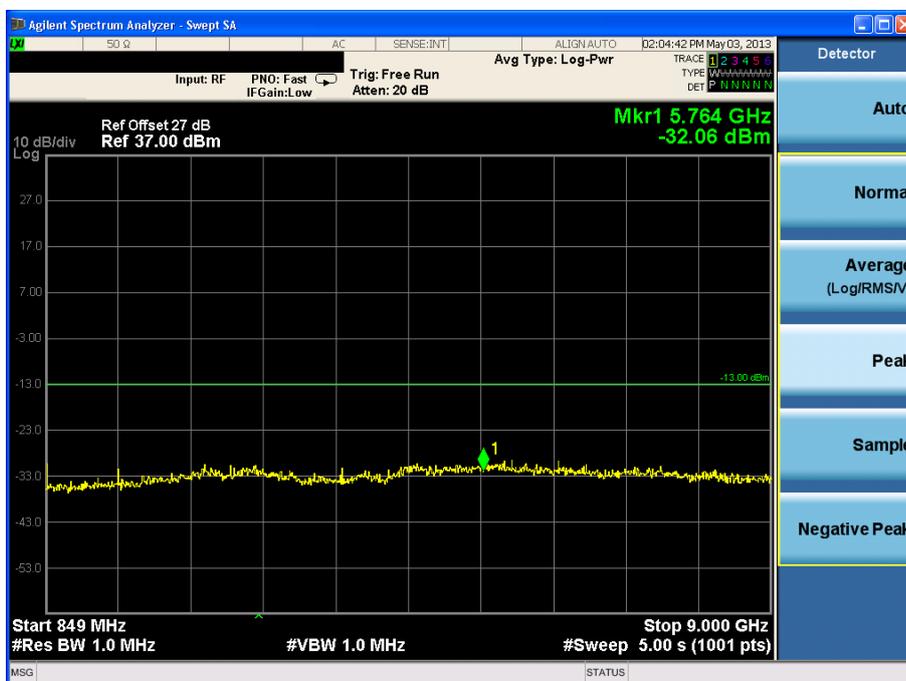


Channel 189, 30MHz~824MHz



Channel 189, 824MHz~849MHz

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



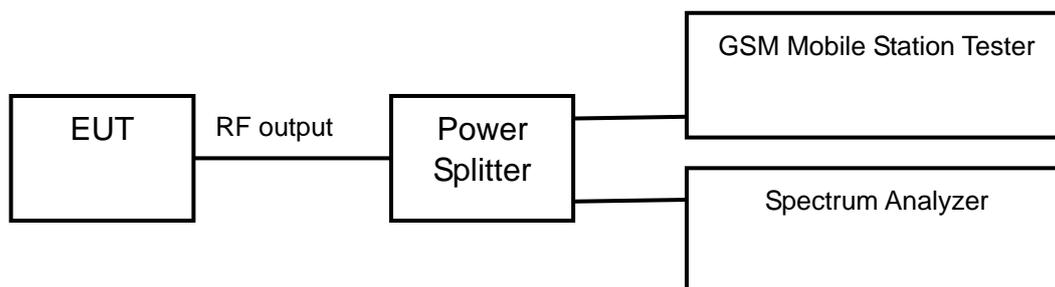
Channel 189, 849MHz~9GHz

### 2.2.1.6 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 RBW is set to at least 1% of the emission bandwidth on spectrum analyzer.

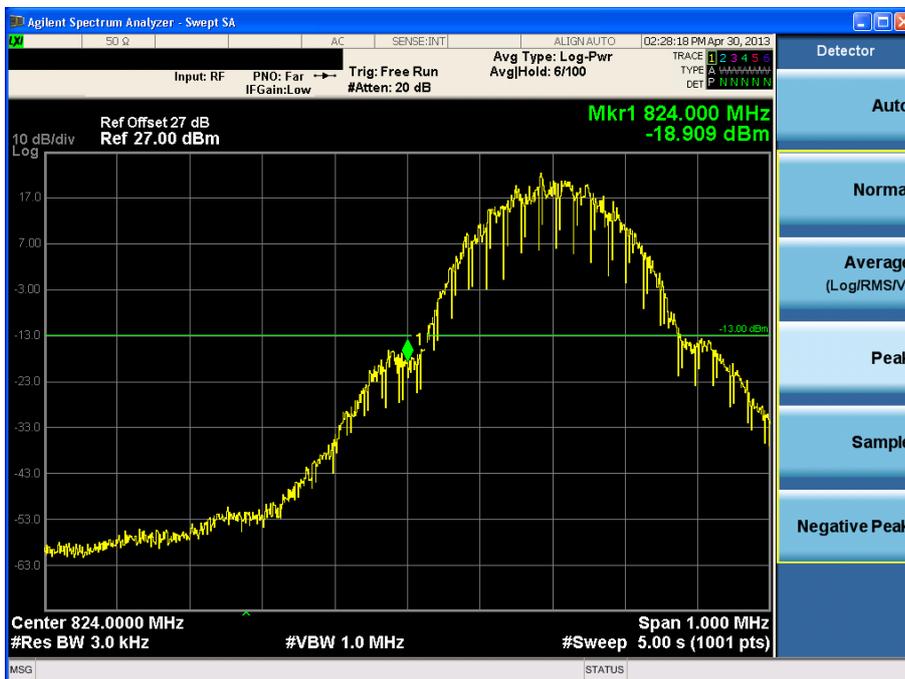
The measurement will be conducted at two channels No128 and No251 (Bottom and top channels of GSM850 band)

Limits	$\leq -13\text{dBm}$

Test result:

Refer to the following figures.

GSM/GPRS MODE:

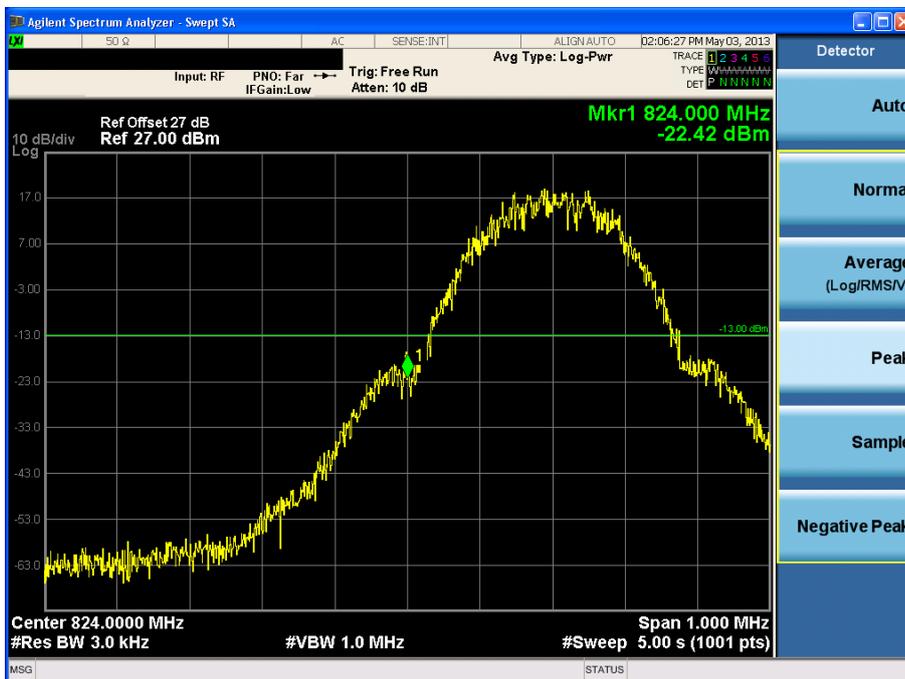


Channel 128

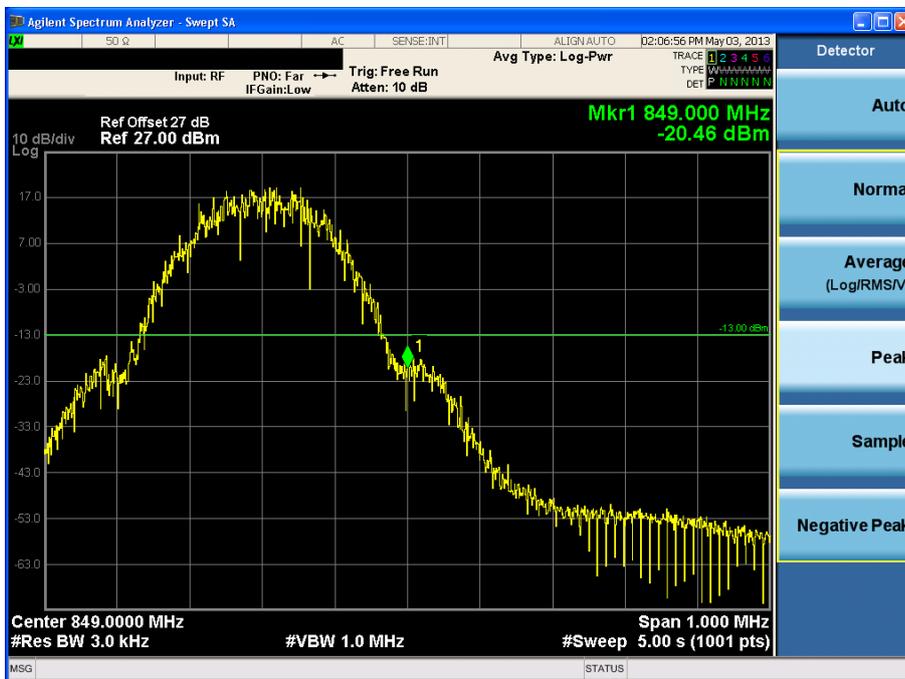


Channel 251

EDGE (GMSK) MODE:



Channel 128



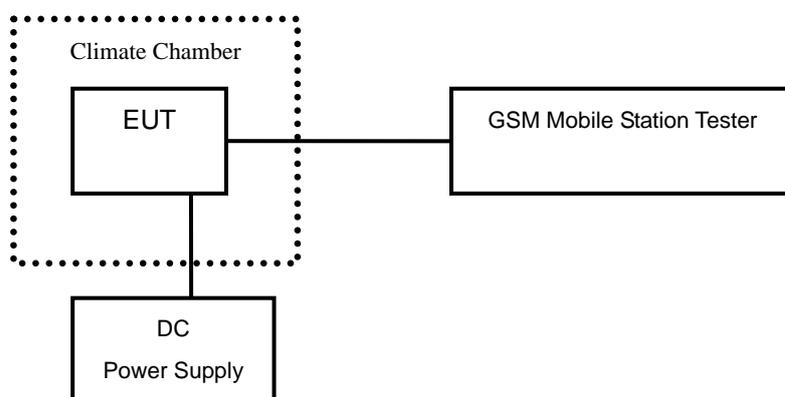
Channel 251

### 2.2.1.7 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	0.015	0.016	0.011
-20	0.017	0.016	0.015
-10	0.015	0.013	0.013
0	0.012	0.012	0.017
+10	0.011	0.011	0.013
+20	0.010	0.012	0.010
+30	0.011	0.014	0.012
+40	0.012	0.014	0.015
+50	0.014	0.016	0.013

Voltage (V)	Test Result (ppm)@20°C		
	Channel 128	Channel 189	Channel 251
3.5	0.012	0.011	0.013
4.2	0.011	0.013	0.013

EDGE (GMSK) MODE:

Temperature(°C)	Test Result (ppm)@3.8V		
	Channel 128	Channel 189	Channel 251
-30	0.008	0.013	0.016
-20	0.009	0.012	0.019
-10	0.011	0.010	0.020
0	0.014	0.012	0.021
+10	0.006	0.013	0.019
+20	0.011	0.010	0.017
+30	0.007	0.014	0.017
+40	0.008	0.012	0.015
+50	0.009	0.011	0.019

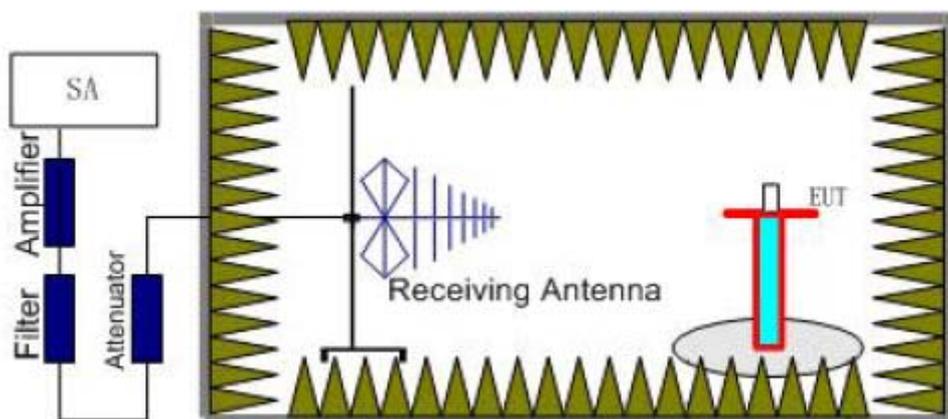
Voltage (V)	Test Result (ppm)@20°C		
	Channel 128	Channel 189	Channel 251
3.5	0.009	0.012	0.015
4.2	0.010	0.011	0.013

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

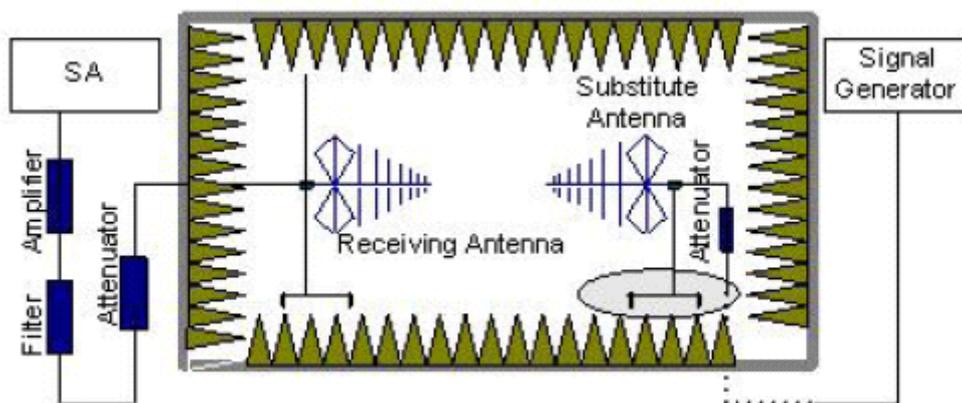
Ambient condition

Temperature	Relative humidity	Pressure
26°C	43%	101.3kPa

Test Setup:



Step 1



Step 2

Test procedure:

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<sup>th</sup> 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.

**Calculation procedure:**

The data of cable loss, antenna gain and air loss 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, antenna gain and air loss. The basic equation with a sample calculation is as followed:

$$P = P_R + L_C + L_A - G$$

Where

P: Power of the Radiated Spurious Emissions (dBm)

P<sub>R</sub>: reading of the receiver (dBm)

L<sub>C</sub>: Cable Lose (dB)

L<sub>A</sub>: Air loss (dB)

G: Antenna Gain (dBi)

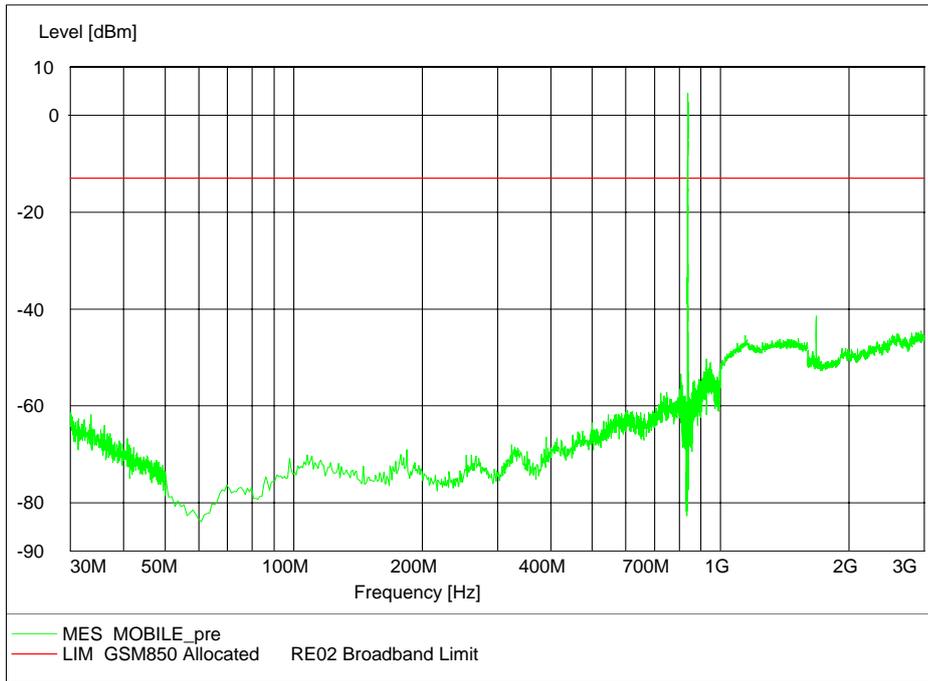
Assumed the reading of the receiver is -60dBm. A cable lose of 10dB, an air lose of 30dB and an antenna gain of 11dBi are added.

$$P = P_R + L_C + L_A - G = -60 + 10 + 30 - 11 = -31 \text{ dBm}$$

The measurement will be conducted at one channel No189 (middle channels of GSM850 band)

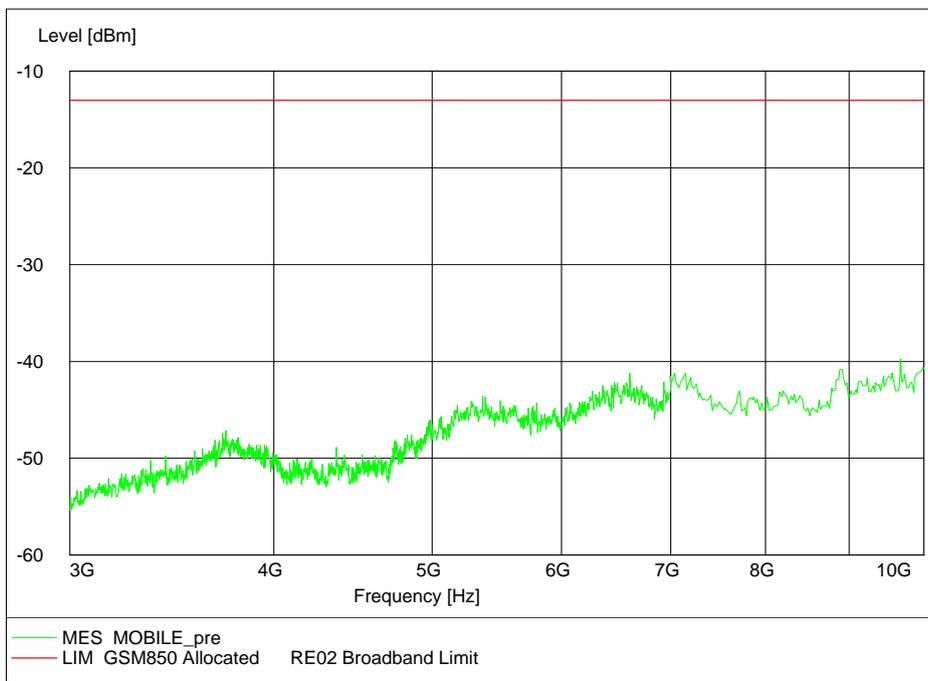
Limits	≤ -13dBm
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Test result:  
GSM/GPRS MODE:



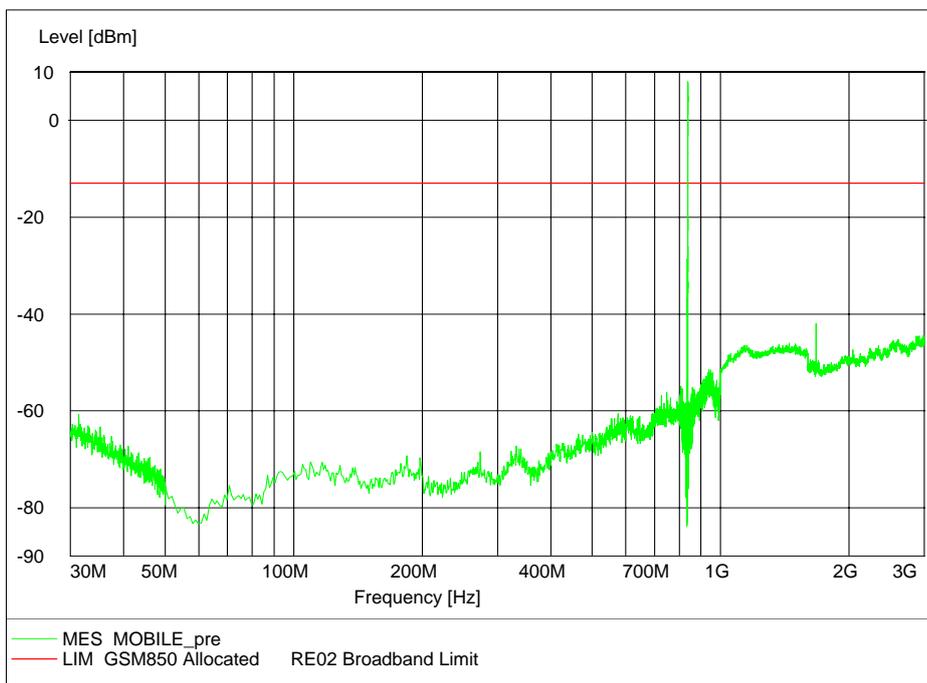
Channel 189, 30MHz~3GHz

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



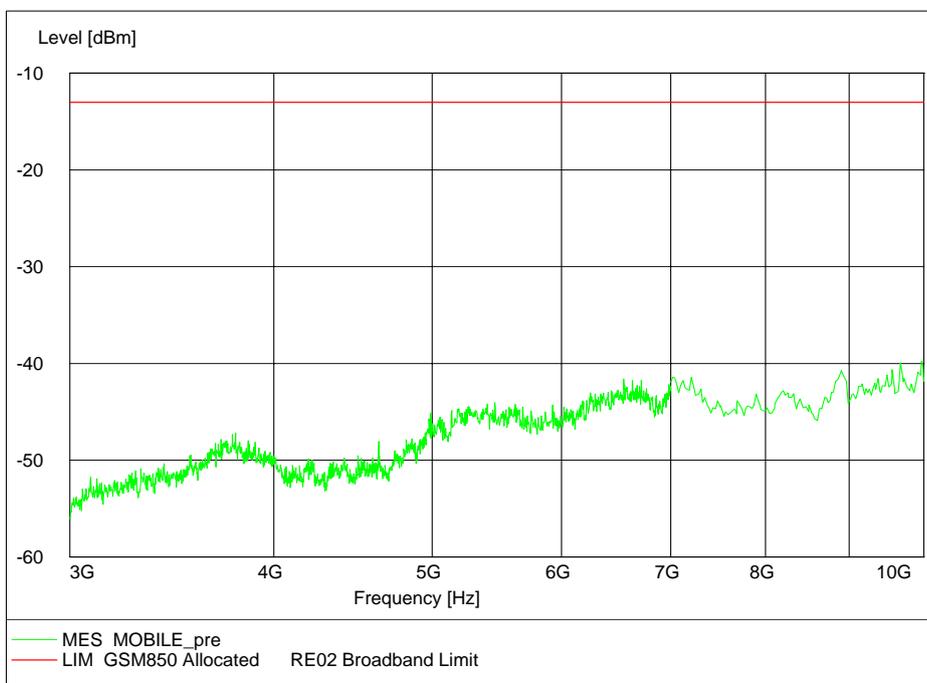
Channel 189, 3GHz~10GHz

EDGE (GMSK) MODE:



Channel 189, 30MHz~3GHz

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



Channel 189, 3GHz~10GHz

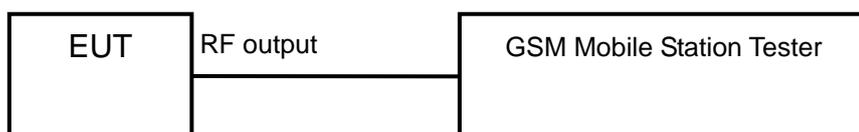
## 2.2.2 PCS1900

### 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	29.6
1880.0	661	29.5
1909.8	810	29.4

EDGE (GMSK) MODE:

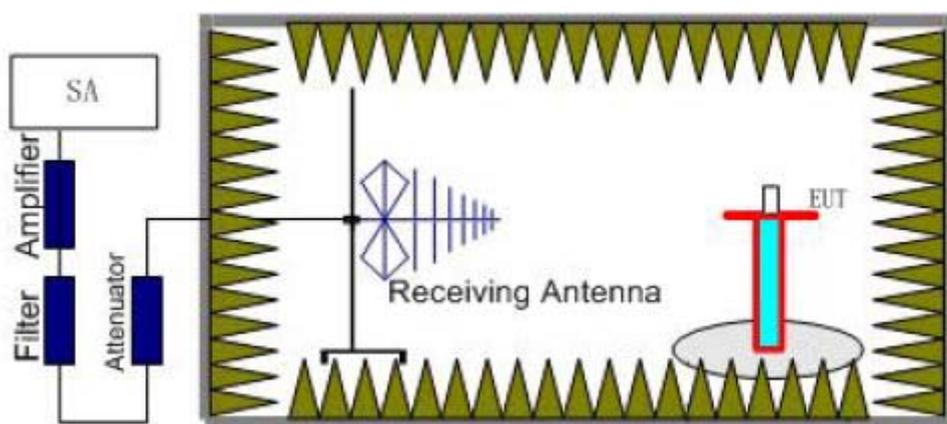
Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
1850.2	512	29.6
1880.0	661	29.6
1909.8	810	29.4

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

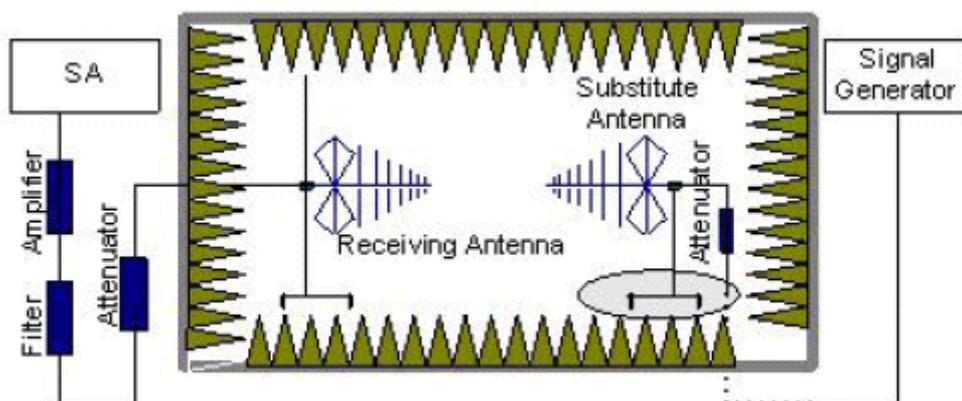
Ambient condition:

Temperature	Relative humidity	Pressure
26°C	43%	101.3kPa

Test setup:



Step 1



Step 2

Test procedure:

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 RMS 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.

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.

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

Limits	$\leq 33\text{dBm}$
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Test result:

GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	E.I.R.P. (dBm)
1850.2	512	28.0
1880.0	661	28.1
1909.8	810	28.1

EDGE (GMSK) MODE:

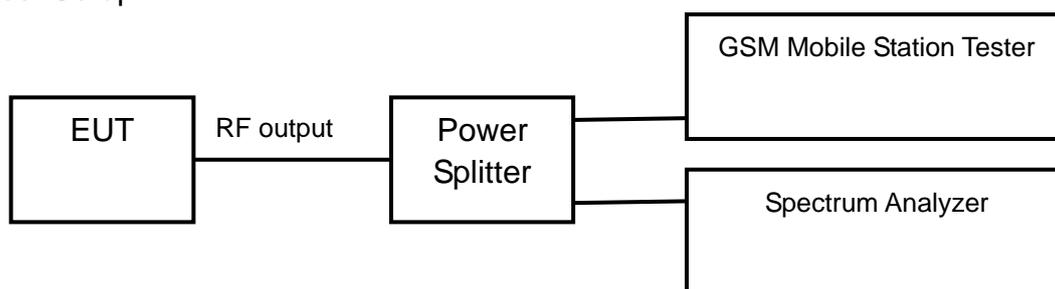
Carrier frequency (MHz)	Channel No.	E.I.R.P. (dBm)
1850.2	512	28.1
1880.0	661	28.1
1909.8	810	28.9

### 2.2.2.3 Occupied Bandwidth-FCC Part2.1049

Ambient condition:

Temperature	Relative humidity	Pressure
23℃	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:

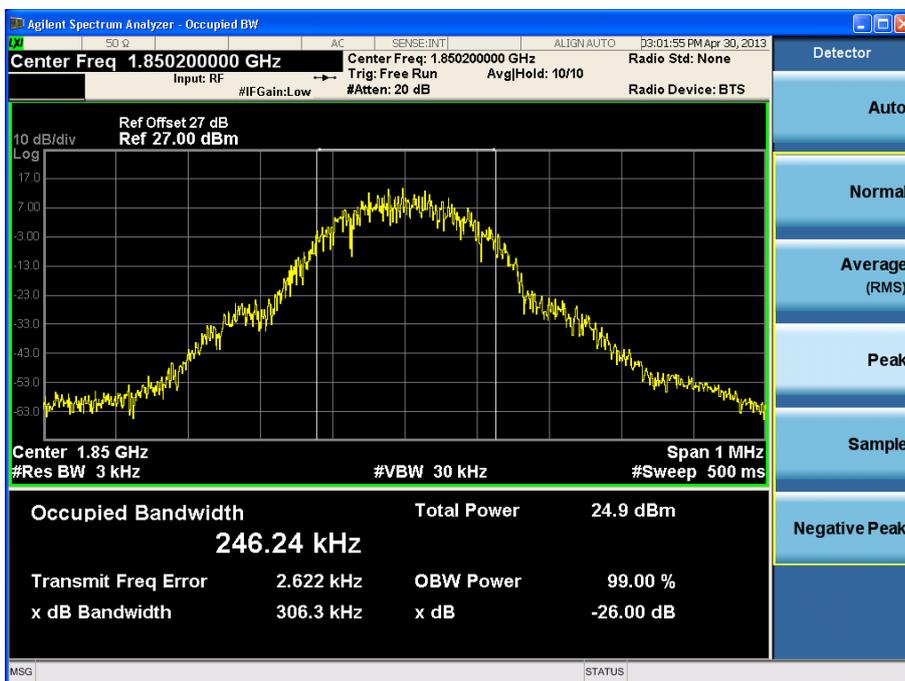
GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	246.24
1880.0	661	246.25
1909.8	810	247.03

EDGE (GMSK) MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	244.10
1880.0	661	243.86
1909.8	810	244.19

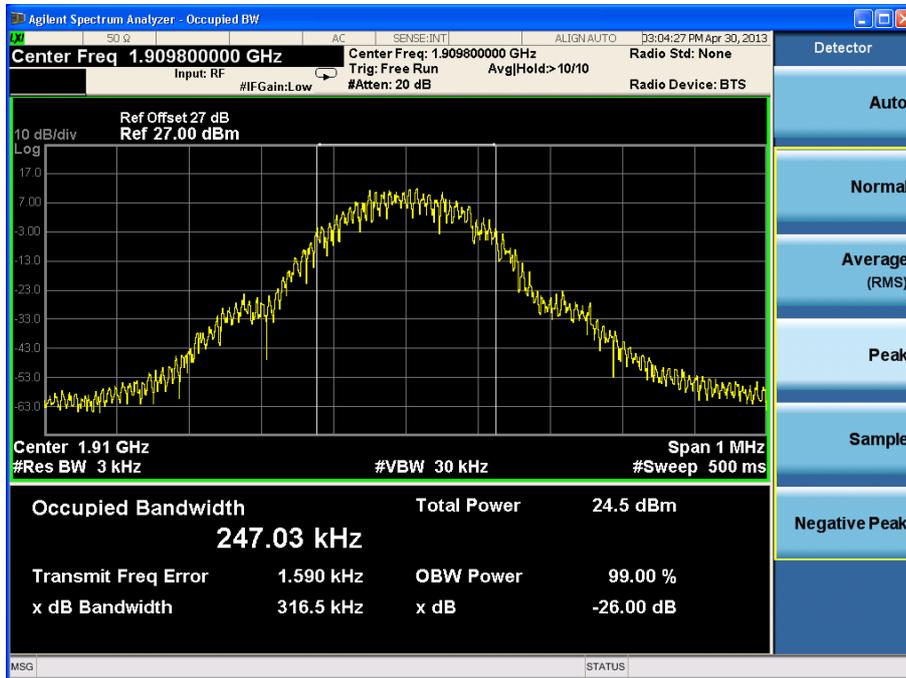
GSM/GPRS MODE:



Channel 512



Channel 661

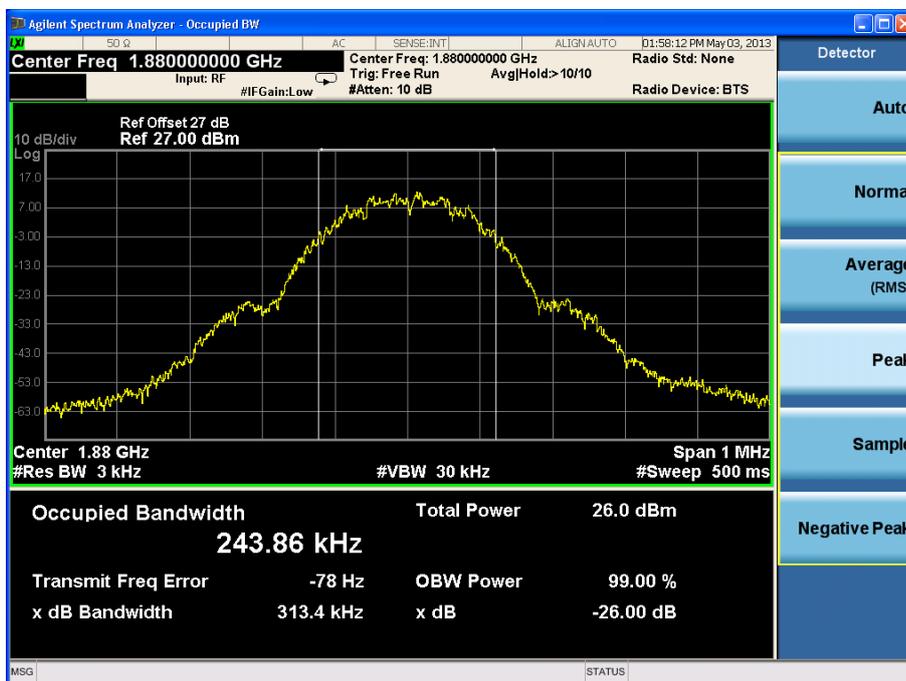


Channel 810

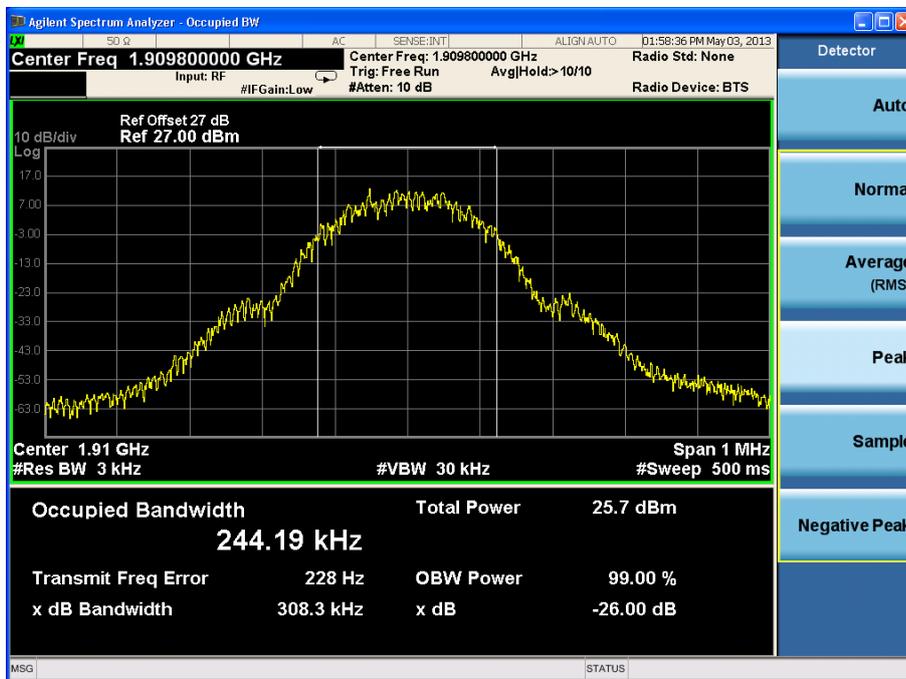
EDGE (GMSK) MODE:



Channel 512



Channel 661



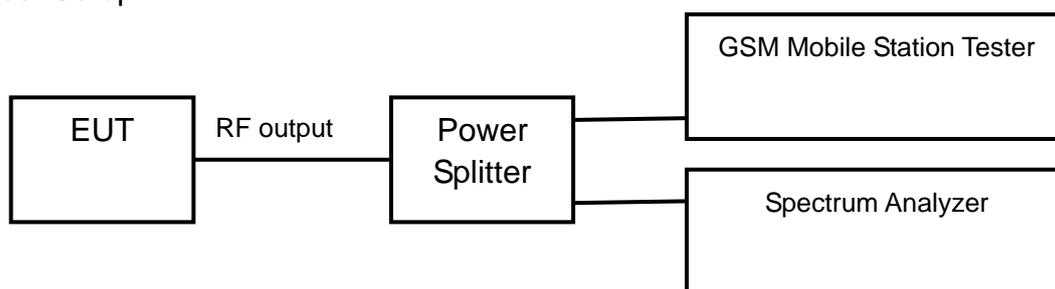
Channel 810

### 2.2.2.4 Emission Bandwidth-FCC Part24.238(b)

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 emission bandwidth is measured using spectrum analyzer. RBW is set to 3kHz on spectrum analyzer. The bandwidth of -26dB transmitter 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 24.238(b)

Test result:

GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power (kHz)
1850.2	512	306.3
1880.0	661	311.1
1909.8	810	316.5

EDGE (GMSK) MODE:

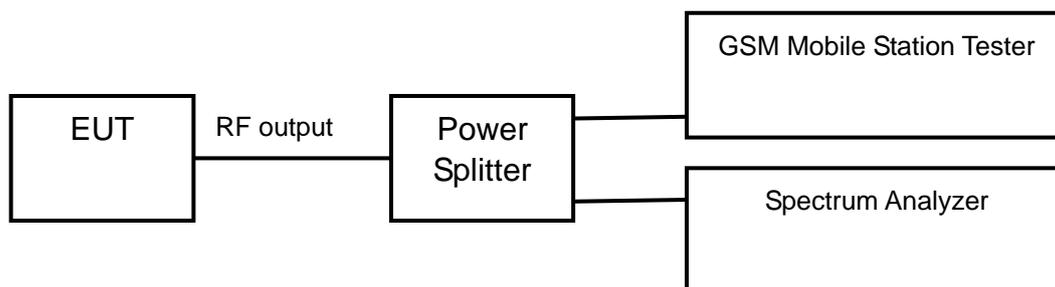
Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power (kHz)
1850.2	512	315.2
1880.0	661	320.1
1909.8	810	308.8

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

Ambient condition:

Temperature	Relative humidity	Pressure
23℃	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<sup>th</sup> harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer.

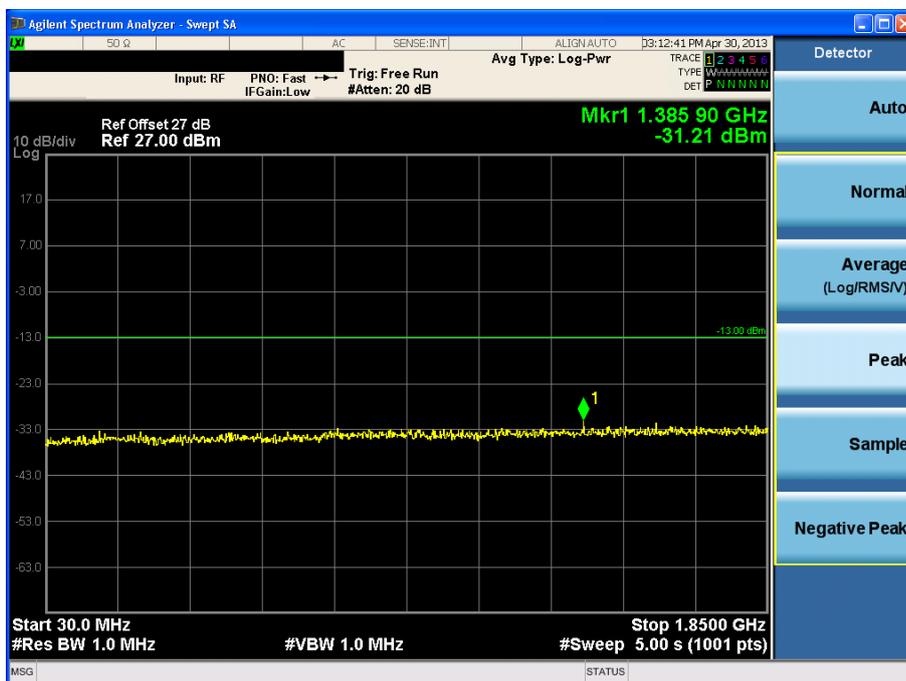
The measurement will be conducted at one channel No661 (middle channel of PCS1900 band)

Limits	≤ -13dBm
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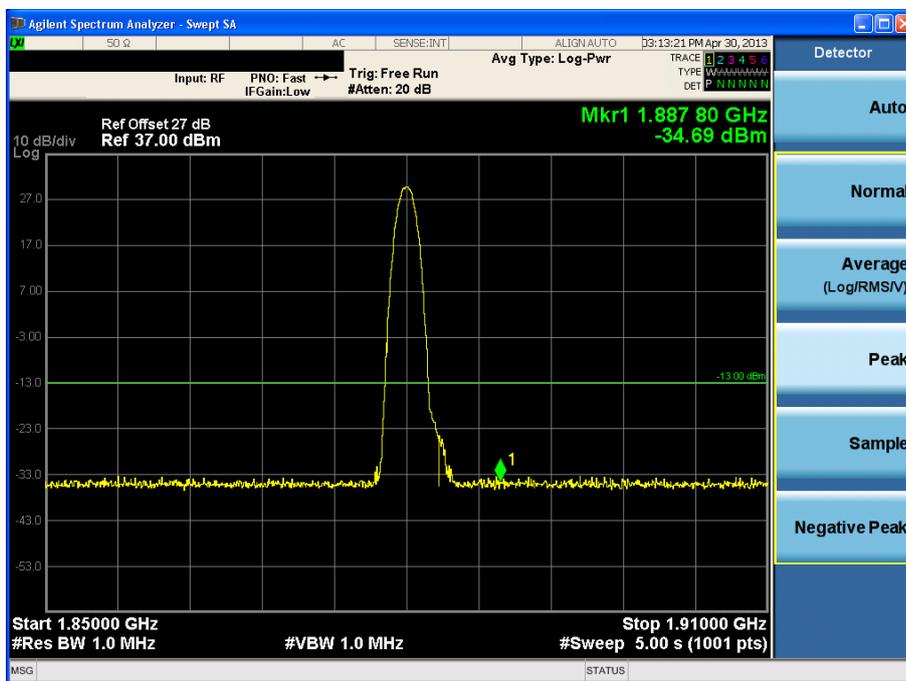
Test result:

Refer to the following figures.

GSM/GPRS MODE:



Channel 661, 30MHz~1850MHz



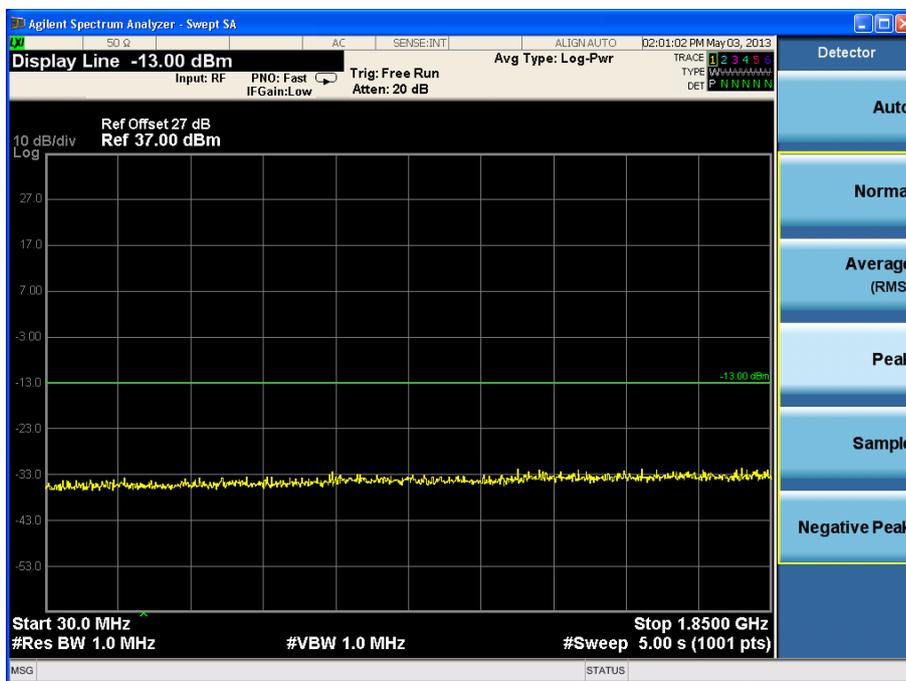
Channel 661, 1850MHz~1910MHz

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

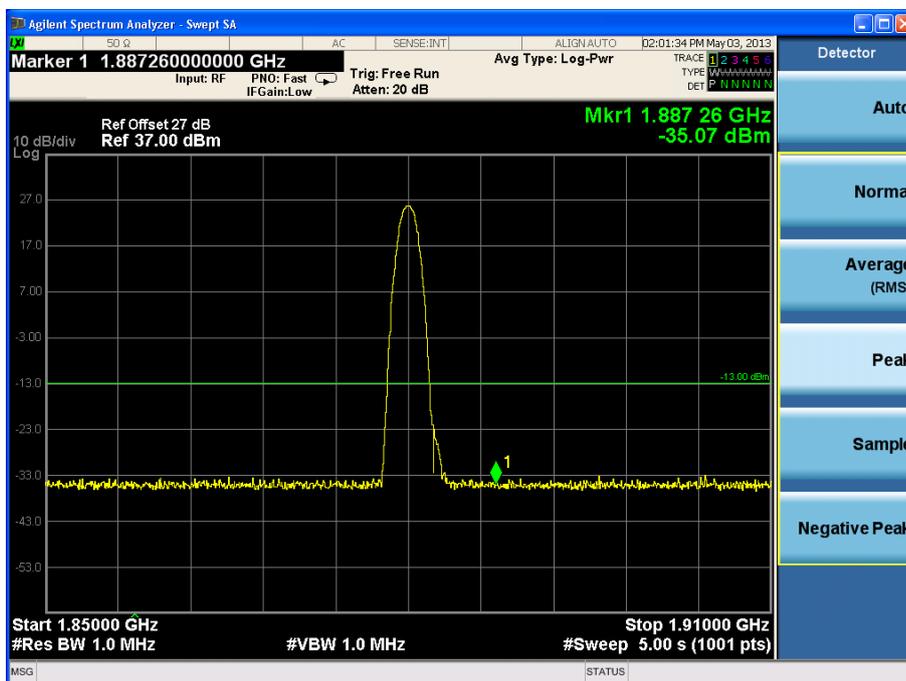


Channel 661, 1910MHz~20GHz

EDGE (GMSK) MODE:



Channel 661, 30MHz~1850MHz



Channel 661, 1850MHz~1910MHz

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



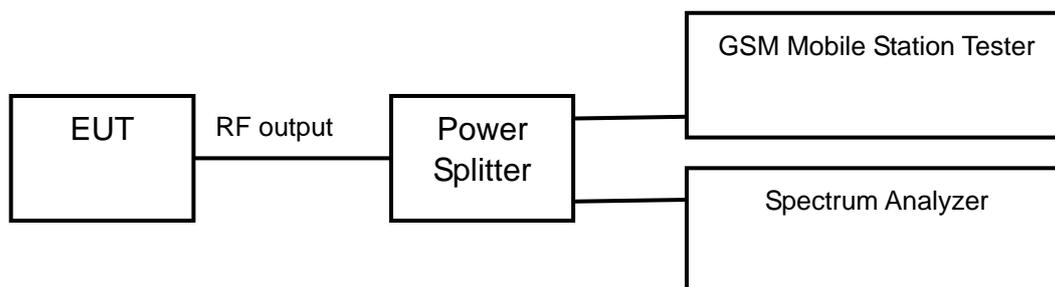
Channel 661, 1910MHz~20GHz

### 2.2.2.6 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 RBW is set to at least 1% of the emission bandwidth on spectrum analyzer.

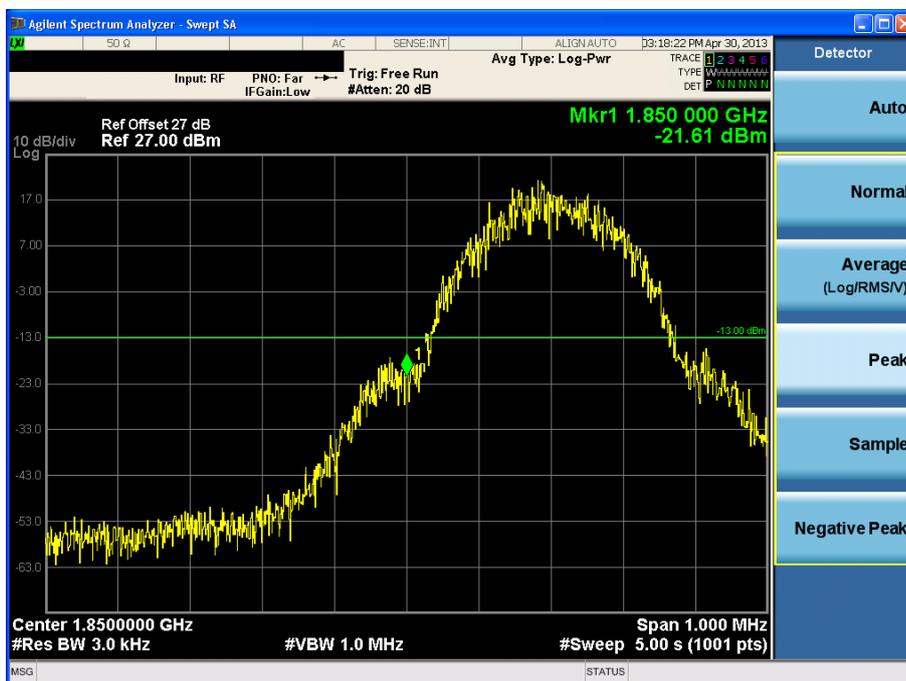
The measurement will be conducted at two channels No512 and No810 (Bottom and top channels of PCS1900 band)

Limits	≤-13dBm

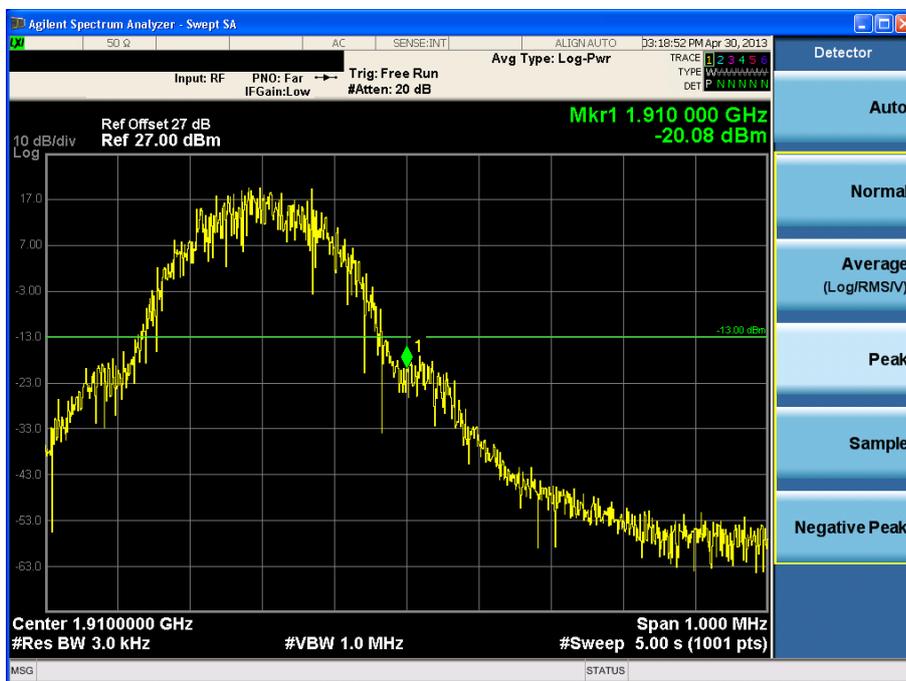
Test result:

Refer to the following figures.

GSM/GPRS MODE:

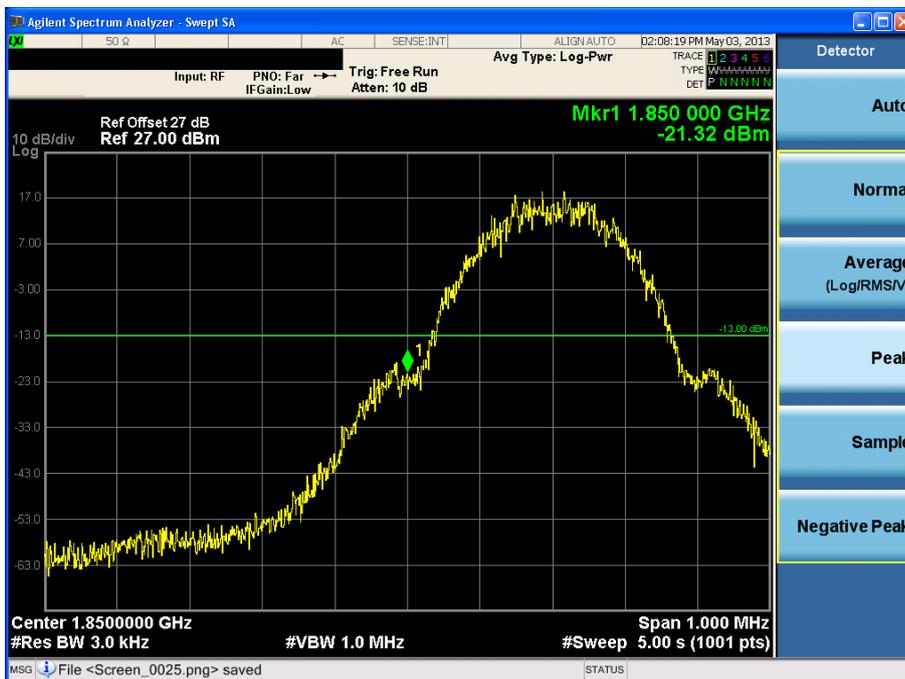


Channel 512

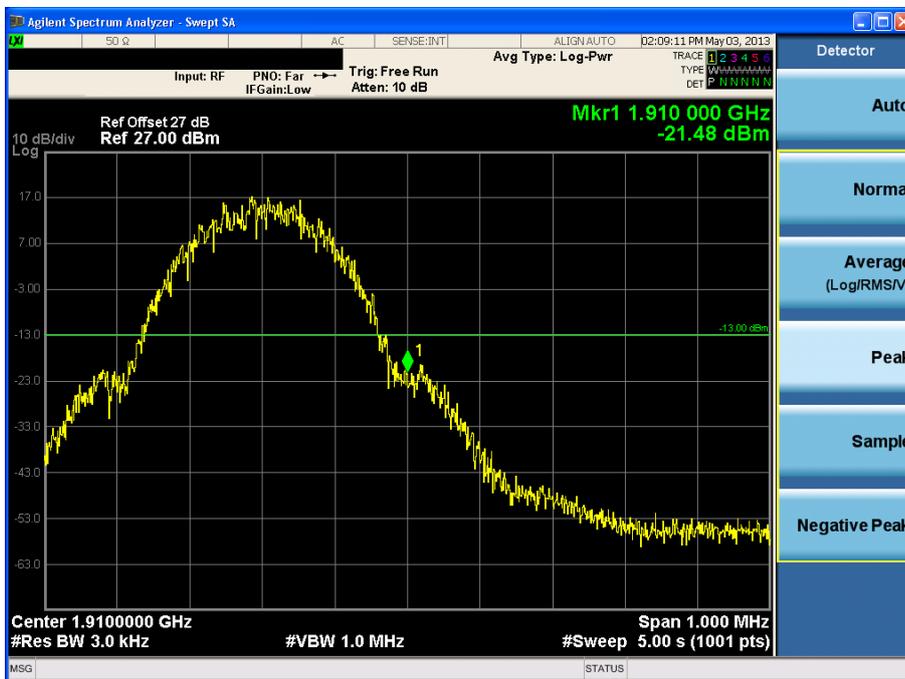


Channel 810

EDGE (GMSK) MODE:



Channel 512



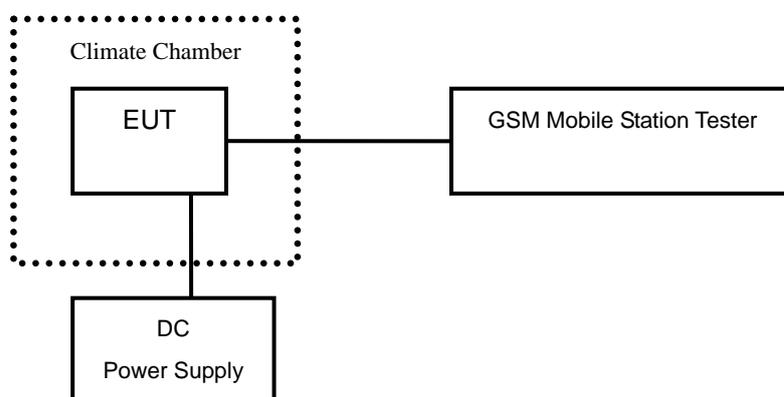
Channel 810

### 2.2.2.7 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	0.031	0.030	0.029
-20	0.027	0.032	0.030
-10	0.020	0.025	0.022
0	0.016	0.017	0.018
+10	0.020	0.015	0.017
+20	0.024	0.025	0.023
+30	0.017	0.022	0.019
+40	0.011	0.018	0.015
+50	0.010	0.015	0.013

Voltage (V)	Test Result (ppm)@20°C		
	Channel 512	Channel 661	Channel 810
3.5	0.022	0.024	0.021
4.2	0.016	0.020	0.019

EDGE (GMSK) MODE:

Temperature(°C)	Test Result (ppm)@3.8V		
	Channel 512	Channel 661	Channel 810
-30	0.040	0.033	0.035
-20	0.039	0.042	0.029
-10	0.024	0.035	0.033
0	0.032	0.029	0.035
+10	0.029	0.045	0.026
+20	0.028	0.044	0.023
+30	0.029	0.037	0.025
+40	0.027	0.043	0.024
+50	0.024	0.034	0.027

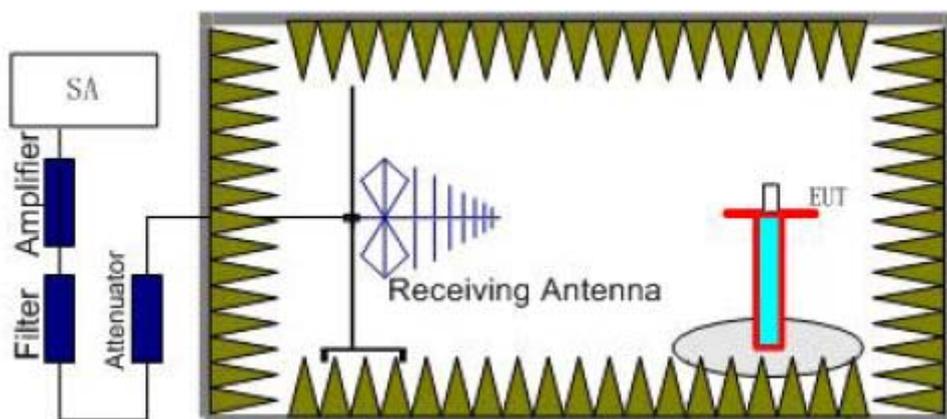
Voltage (V)	Test Result (ppm)@20°C		
	Channel 512	Channel 661	Channel 810
3.5	0.029	0.031	0.025
4.2	0.030	0.035	0.023

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

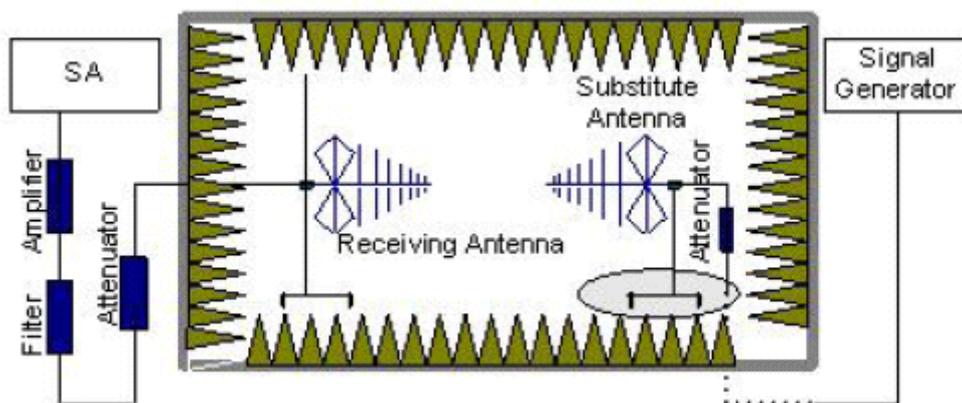
Ambient condition

Temperature	Relative humidity	Pressure
26°C	43%	101.3kPa

Test Setup:



Step 1



Step 2

Test procedure:

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<sup>th</sup> 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.

**Calculation procedure:**

The data of cable loss, antenna gain and air loss 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, antenna gain and air loss. The basic equation with a sample calculation is as followed:

$$P = P_R + L_C + L_A - G$$

Where

P: Power of the Radiated Spurious Emissions (dBm)

P<sub>R</sub>: reading of the receiver (dBm)

L<sub>C</sub>: Cable Lose (dB)

L<sub>A</sub>: Air loss (dB)

G: Antenna Gain (dBi)

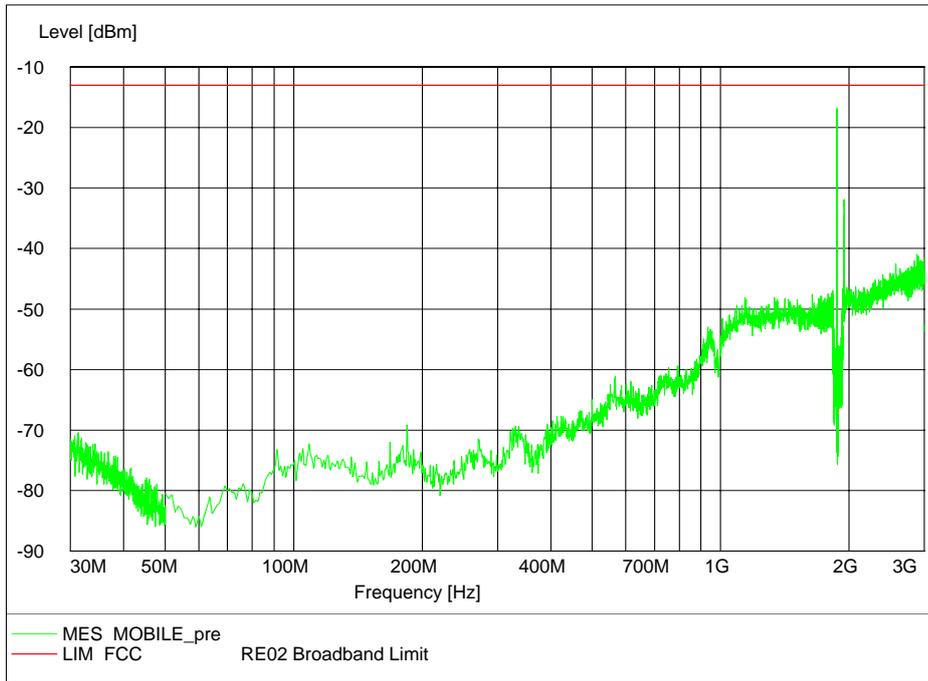
Assumed the reading of the receiver is -60dBm. A cable lose of 10dB, an air lose of 30dB and an antenna gain of 11dBi are added.

$$P = P_R + L_C + L_A - G = -60 + 10 + 30 - 11 = -31 \text{ dBm}$$

The measurement will be conducted at one channel No661 (middle channels of PCS1900 band).

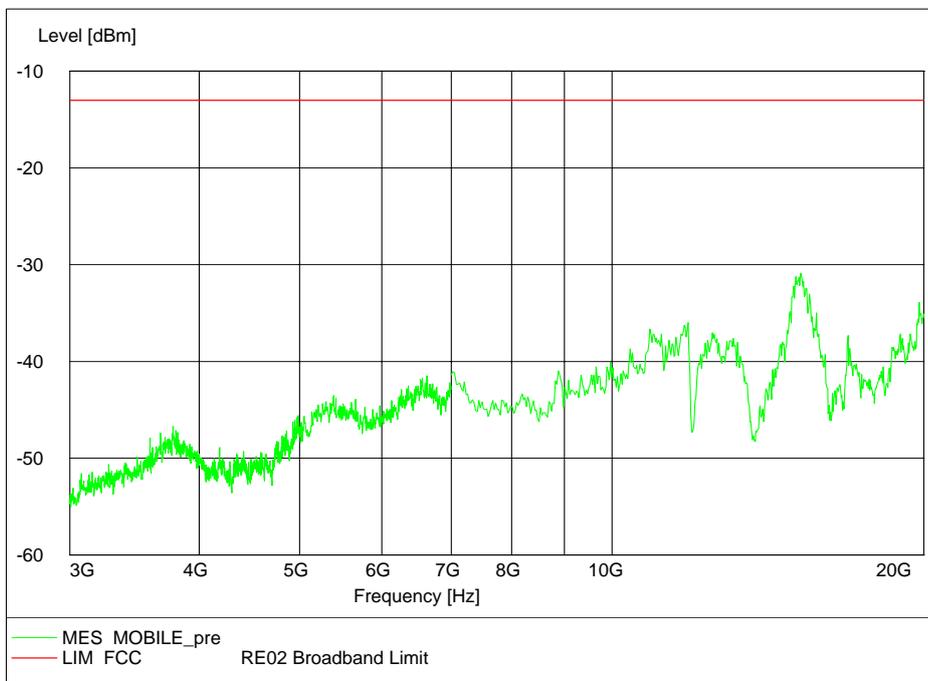
Limits	≤ -13dBm
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Test result:  
 GSM/GPRS MODE:



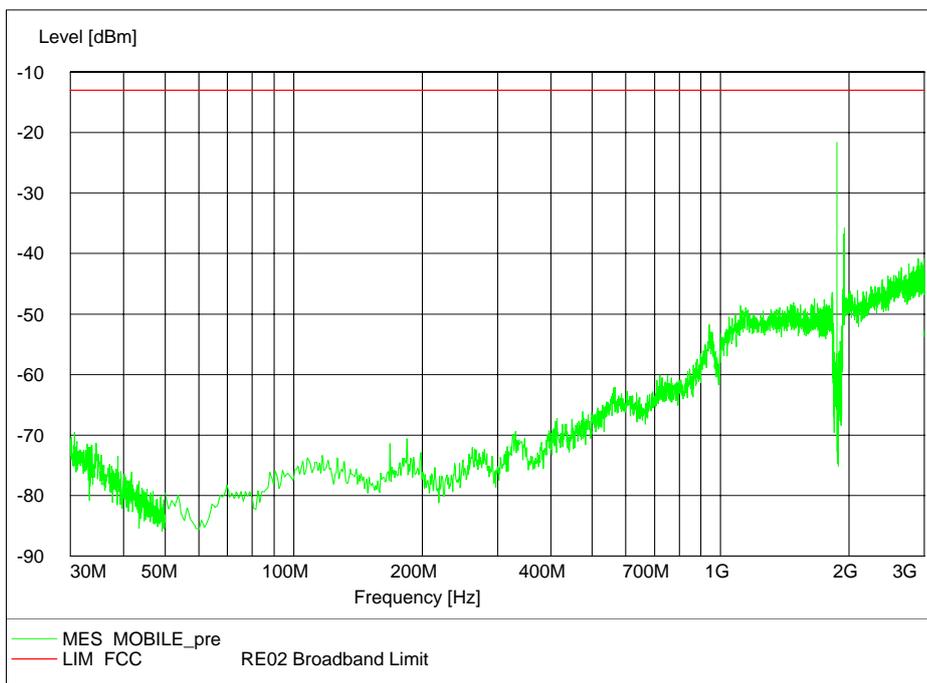
Channel 661, 30MHz~3GHz

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



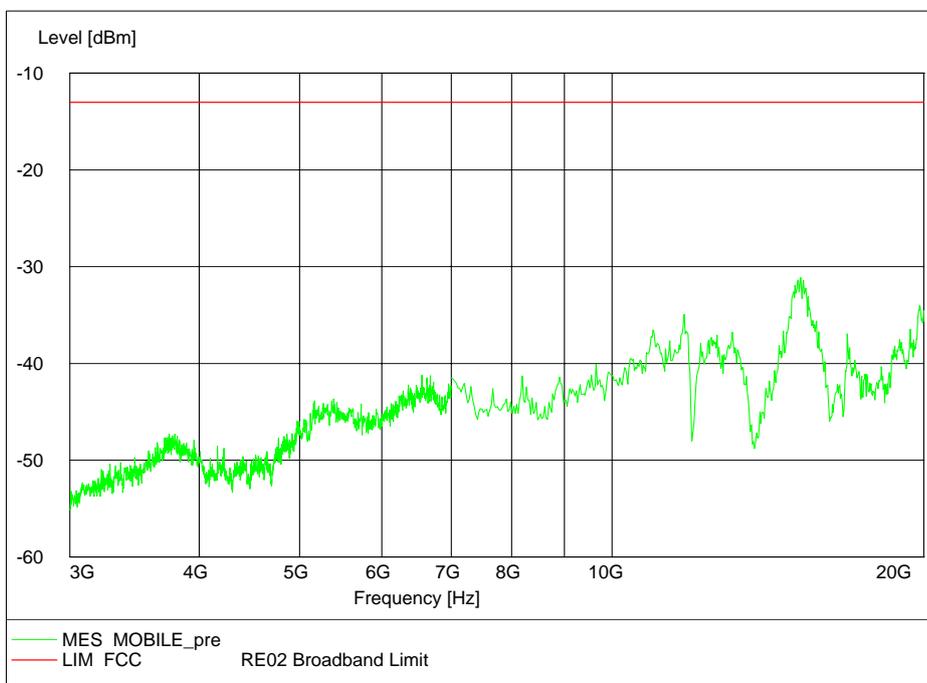
Channel 661, 3GHz~20GHz

EDGE (GMSK) MODE:



Channel 661, 30MHz~3GHz

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



Channel 661, 3GHz~20GHz

### 2.3. List of test equipments

No.	Name/Model	Manufacturer	S/N	Calibration Due Date
1	E5515C(8960) Mobile Station Tester	Agilent	MY48367401	2013.08.19
2	N9020A Spectrum Analyzer	Agilent	MY48010771	2013.08.19
3	DC Power Supply E3645A	Agilent	MY40000740	2013.08.19
4	Power Splitter 11850C	Agilent	026057	2013.08.19
5	12.65m×8.03m×7.50m Fully-Anechoic Chamber	FRANKONIA	-----	-----
6	Turn table Diameter:1m	HD	-----	-----
7	Antenna master FAC(MA4.0)	MATURO	-----	-----
8	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100030	2013.08.19
9	HL562 Ultra log antenna	R&S	100016	2013.08.19
10	3160-09 Receive antenna	SCHWARZ-BECK	002058-002	2013.08.19
11	ESI 40 EMI test receiver	R&S	100015	2013.08.19
12	Radio tester	CMU 200	114667	2013.08.19

## Appendix

### Appendix1 Test Setup