
TEST REPORT

Report No.: SRTC2010-H024-E0017

Product Name: GSM/GPRS/EDGE/

WCDMA/HSDPA/HSUPA/HSPA+ Module

Product Model: MC8705

Applicant: Sierra Wireless Inc.

Manufacture: Sierra Wireless 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: N7NMC8705

IC: 2417C-MC8705

The State Radio_monitoring_center Testing Center (SRTC)

No.80 Beilishi Road Xicheng District Beijing, China

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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)
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: Sierra Wireless Inc.
Address: 13811 Wireless Way Richmond, British Columbia, Canada,
V6V 3A4.
Country or Region: Canada
Contacted person: Ying Wang
Tel: +1 604 232 1440
Fax: +1 604 231 1109
Email: ywang@sierrawireless.com

1.4 Manufacturer's details

Company: Sierra Wireless Inc.
Address: 13811 Wireless Way Richmond, British Columbia, Canada,
V6V 3A4.
Country or Region: Canada
Contacted person: Ying Wang
Tel: +1 604 232 1440
Fax: +1 604 231 1109
Email: ywang@sierrawireless.com

1.5 Application details

Date of reception of test sample: 26th September 2010

Date of test: 26th September 2010 to 27th October 2010

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/EDGE/WCDMA/HSDPA/HSUPA/HSPA+ Module
FCC ID	N7NMC8705
IC	2417C-MC8705
Frequency range	GSM850: Tx:824~849MHz Rx:869~894MHz PCS1900: Tx:1850~1910MHz Rx:1930~1990MHz
Rated output power	GSM850:33.0dBm PCS1900:30.0dBm
Modulation type	GMSK/8PSK
Emission Designator	GSM:300KGXW GPRS/EDGE:300KG7W
Duplex mode	FDD
Duplex spacing:	GSM850:45MHz PCS1900:80MHz
Antenna type	External
Power Supply	USB docking card
Rated Power Supply Voltage	3.3V
Extreme Temperature	Lowest: -30°C Highest: +50°C
Extreme Voltage	Minimum: 3.2V Maximum: 3.6V
HW Version	Rev1.0
SW Version	T0.2.3.0

1.7.2 EUT details

Name	Model	IMEI
GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/HSPA+ Module	MC8705	3536704000230

1.7.3 Auxiliary equipment details

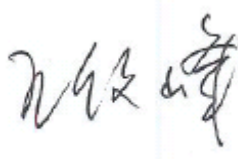
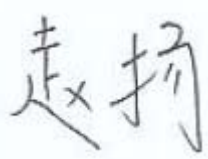
Equipment	USB docking card
Manufacturer	Flextronics Electronics Technology (Suzhou) Co. Ltd.
Model Number	-----

Equipment	Notebook
Manufacturer	IBM
Model Number	T23

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	Type of Modulation	IC RSS-132 § 4.2 IC RSS-133 § 6.2	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)	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. Zhao Yang Test engineer 	Issued date: 2010.12.02

2.2 Test result

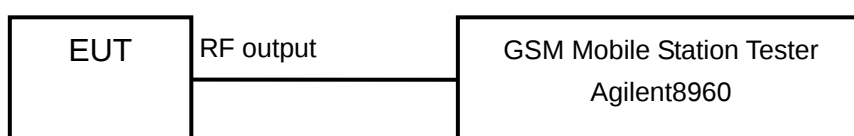
2.2.1 GSM850

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

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

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

GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
824.2	128	32.8
836.4	189	32.8
848.8	251	32.7

EDGE MODE:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
824.2	128	27.3
836.4	189	27.2
848.8	251	27.2

2.2.1.2 Type of Modulation-IC RSS-132 § 4.2

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

Applicable standard:

Equipment certified under this standard shall use digital modulation. However supervisory and other control function signals may use any type of modulation technique. The type of modulation used shall be reported.

Test result:

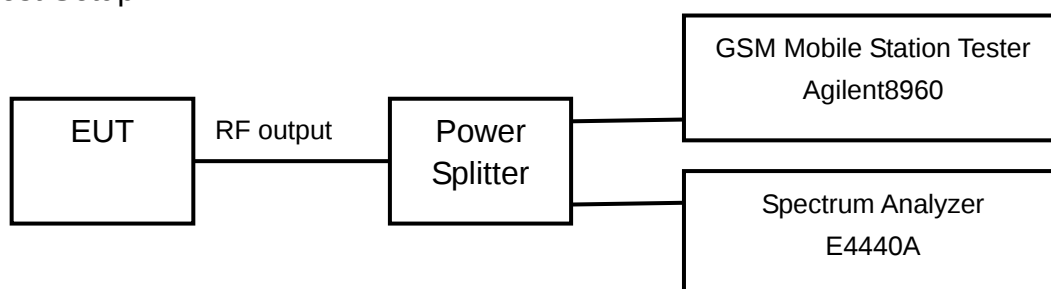
Please refer to section 1.7.1 of this report.

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

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

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:

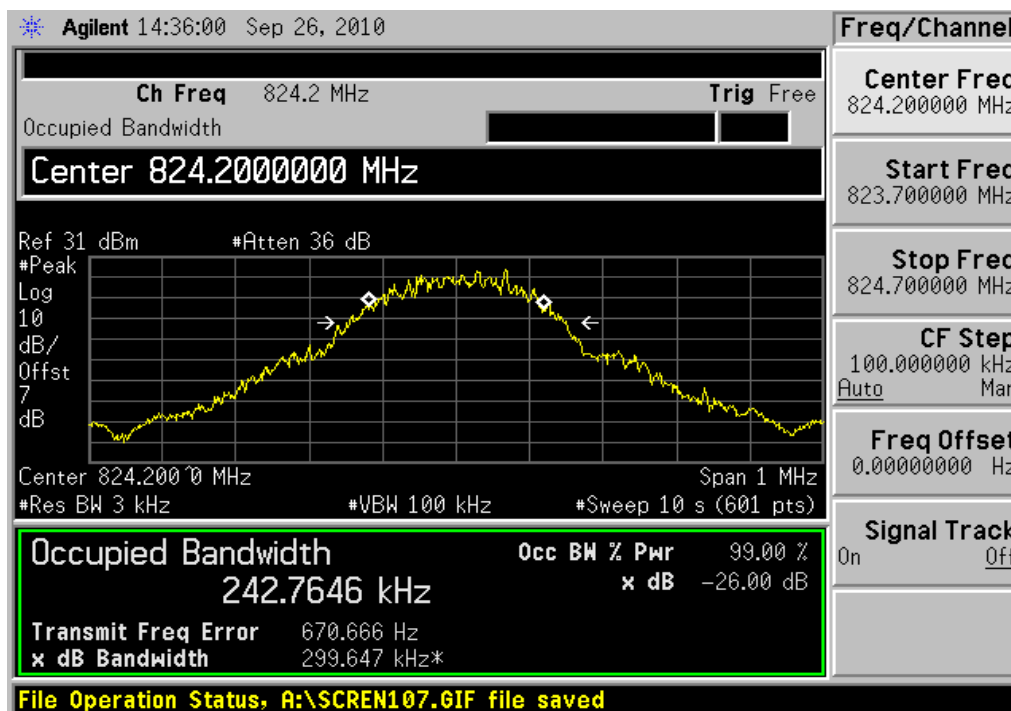
GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	242.76
836.4	189	243.60
848.8	251	243.31

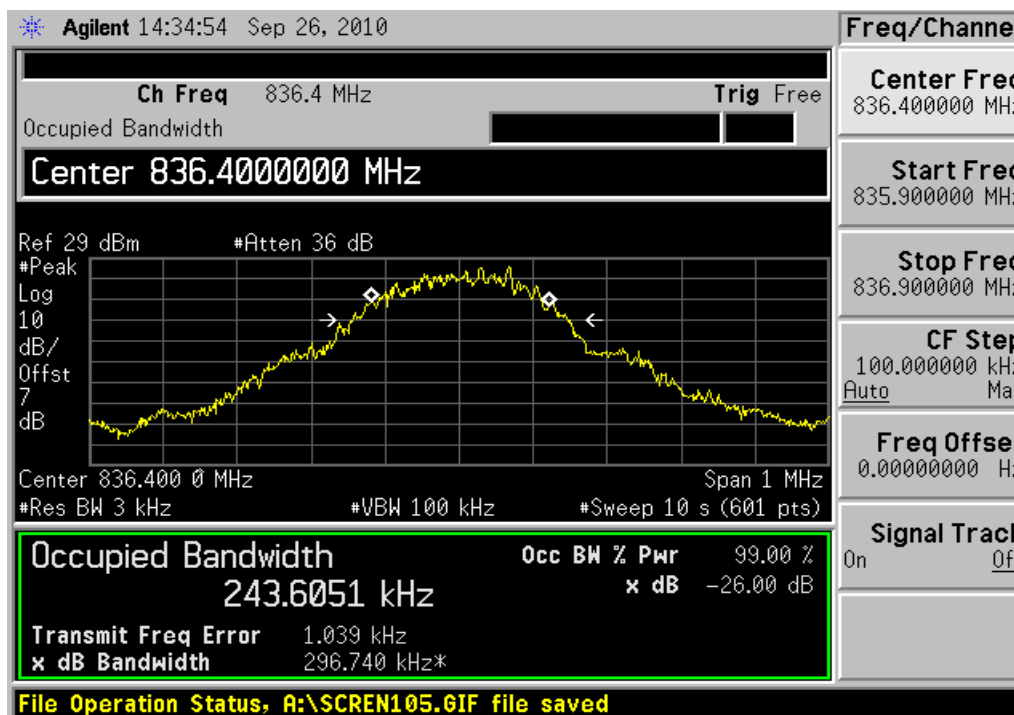
EDGE MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	239.57
836.4	189	239.34
848.8	251	243.31

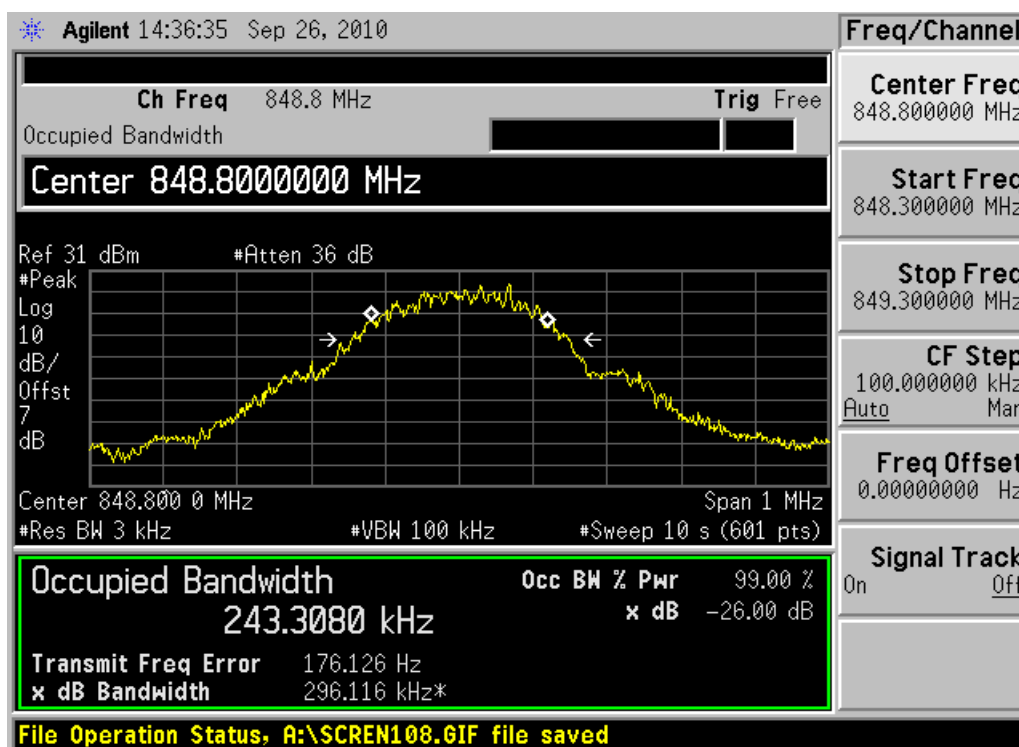
GSM/GPRS MODE:



Channel 128

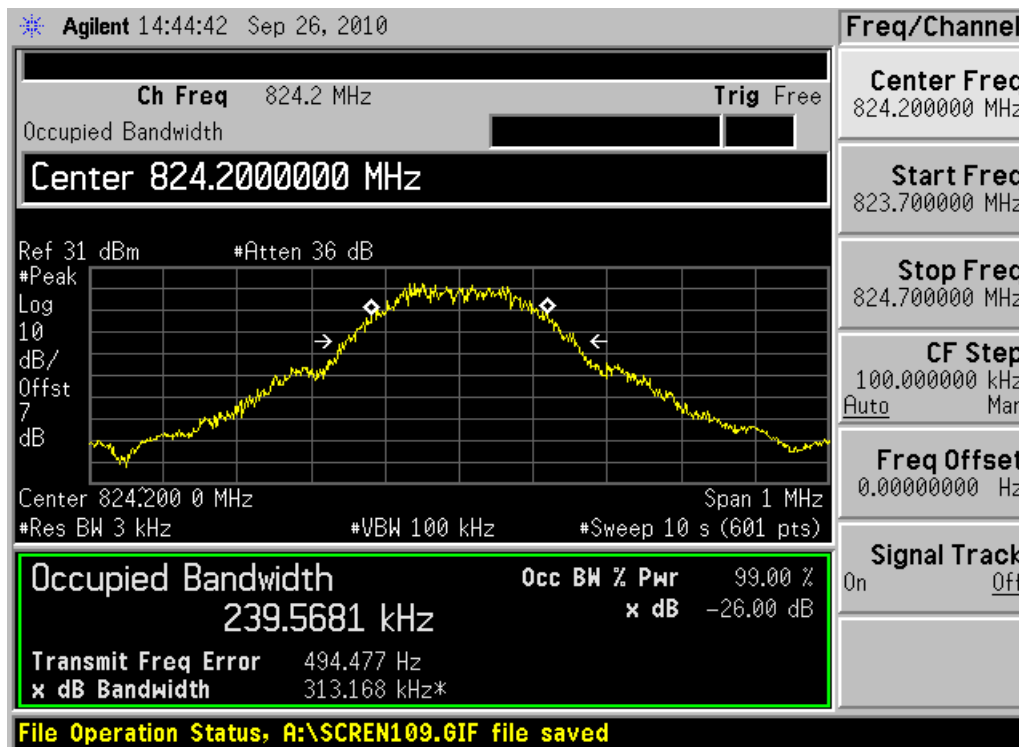


Channel 189

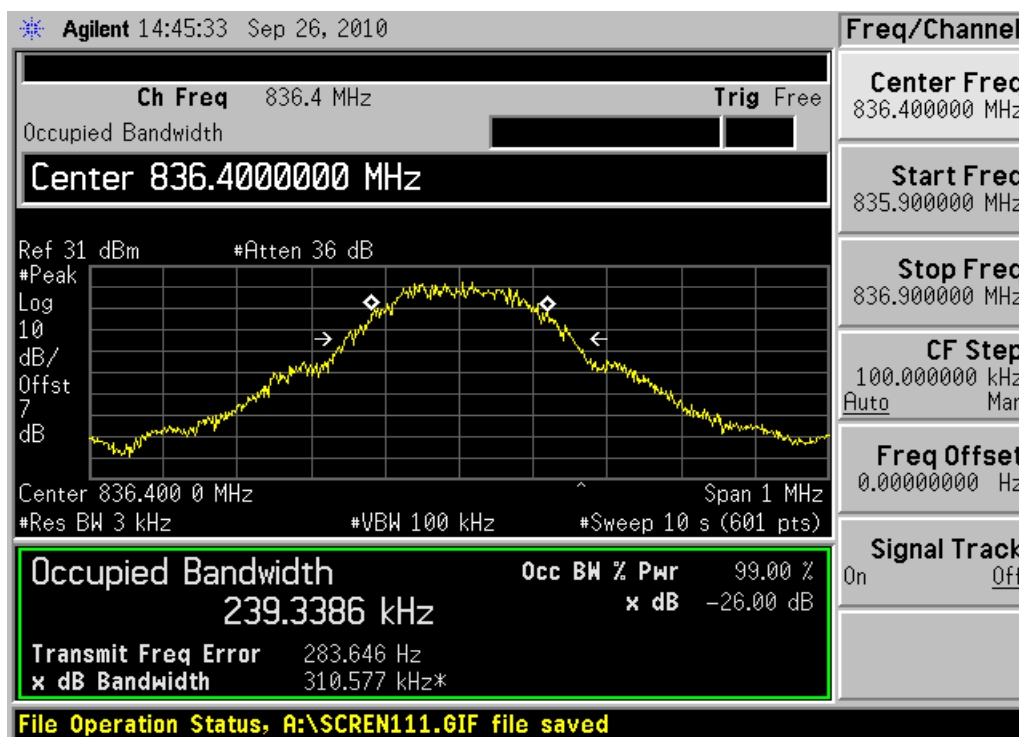


Channel 251

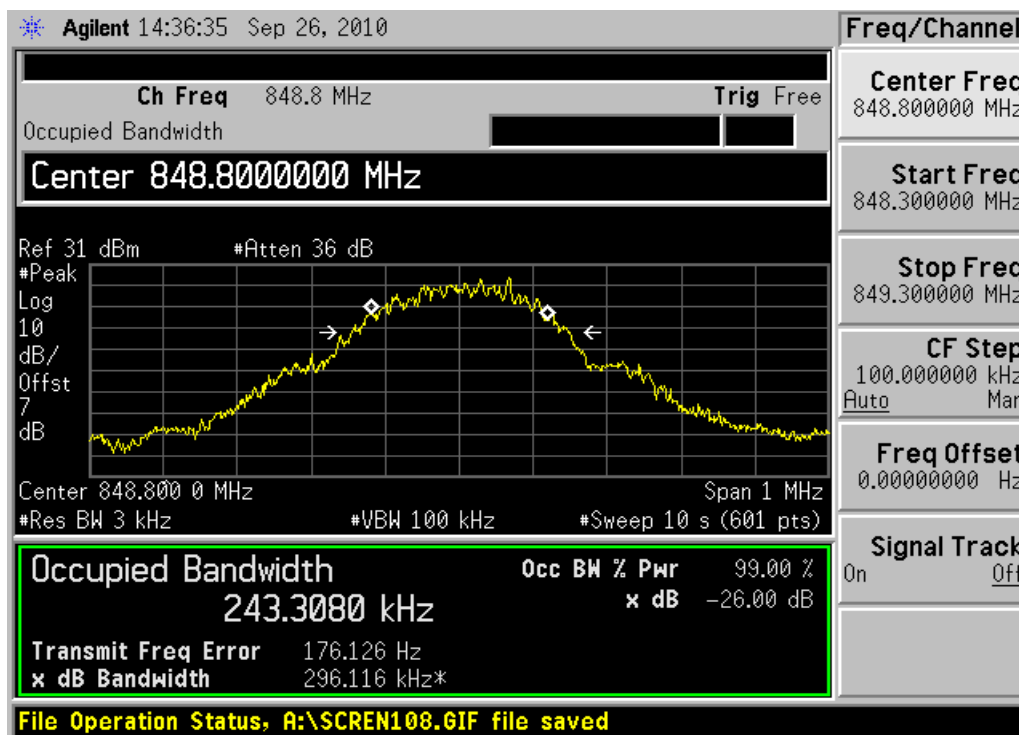
EDGE MODE:



Channel 128



Channel 189



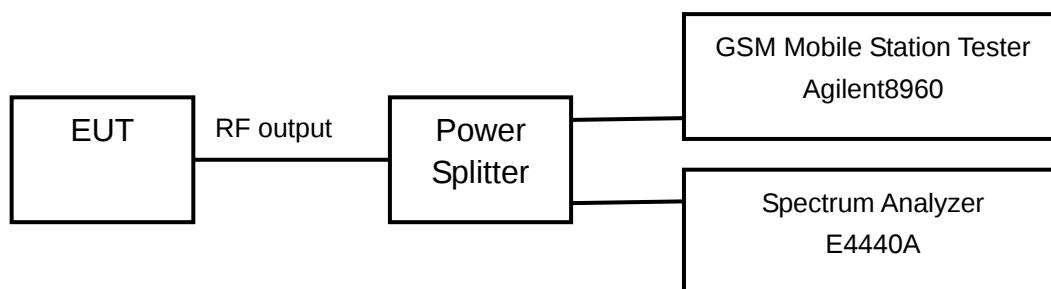
Channel 251

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

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

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 10th harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer.

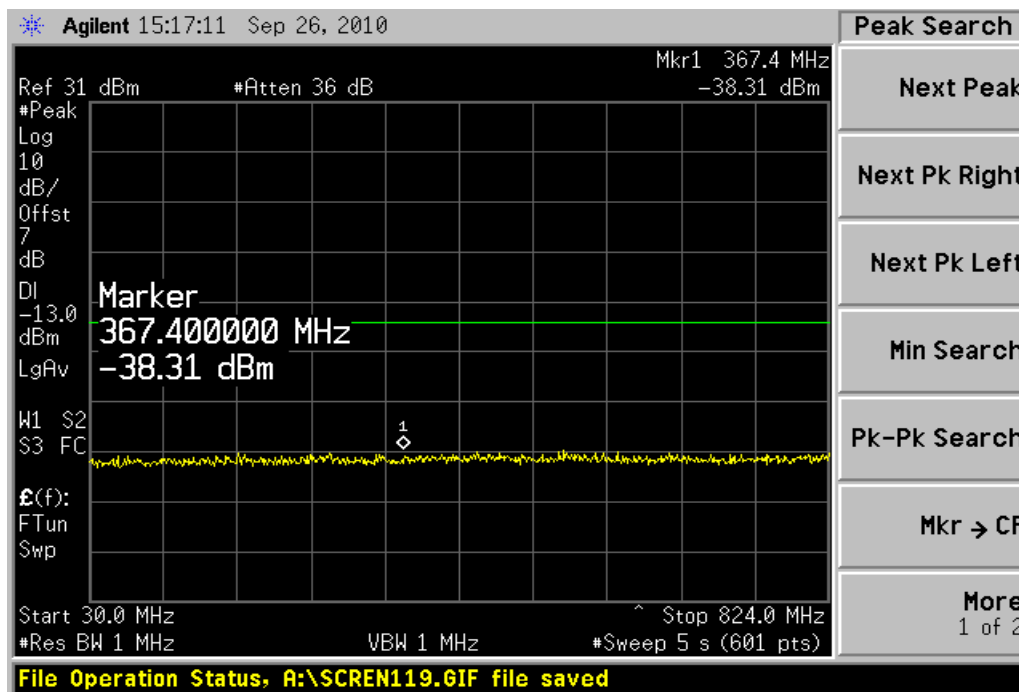
The measurement will be conducted at one channel No189 (middle channel of GSM850 band)

Limits	≤ -13dBm
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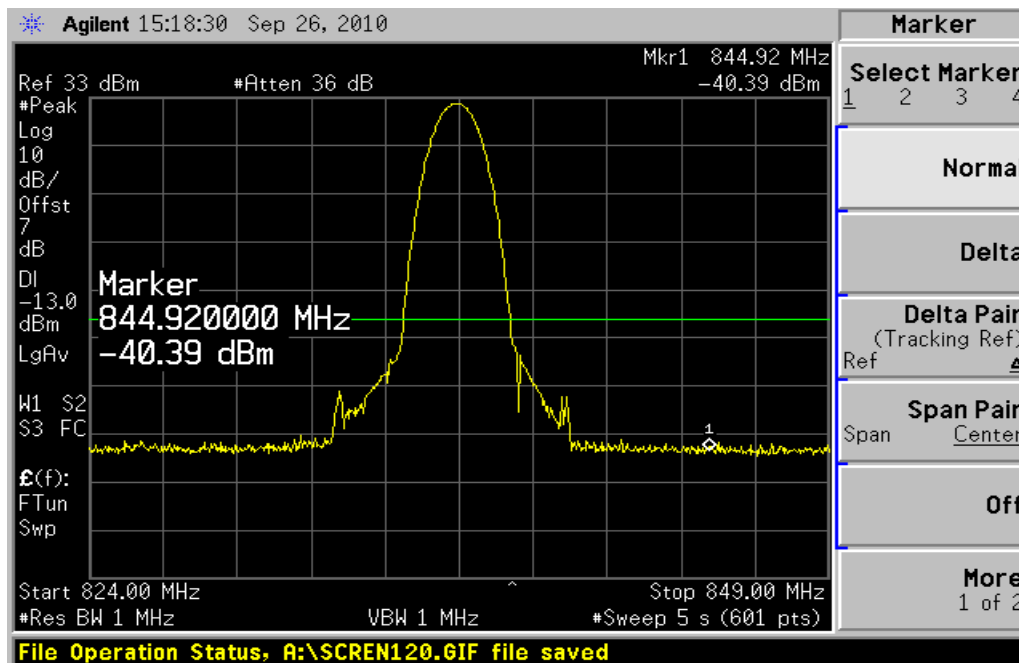
Test result:

Refer to the following figures.

GSM/GPRS MODE:

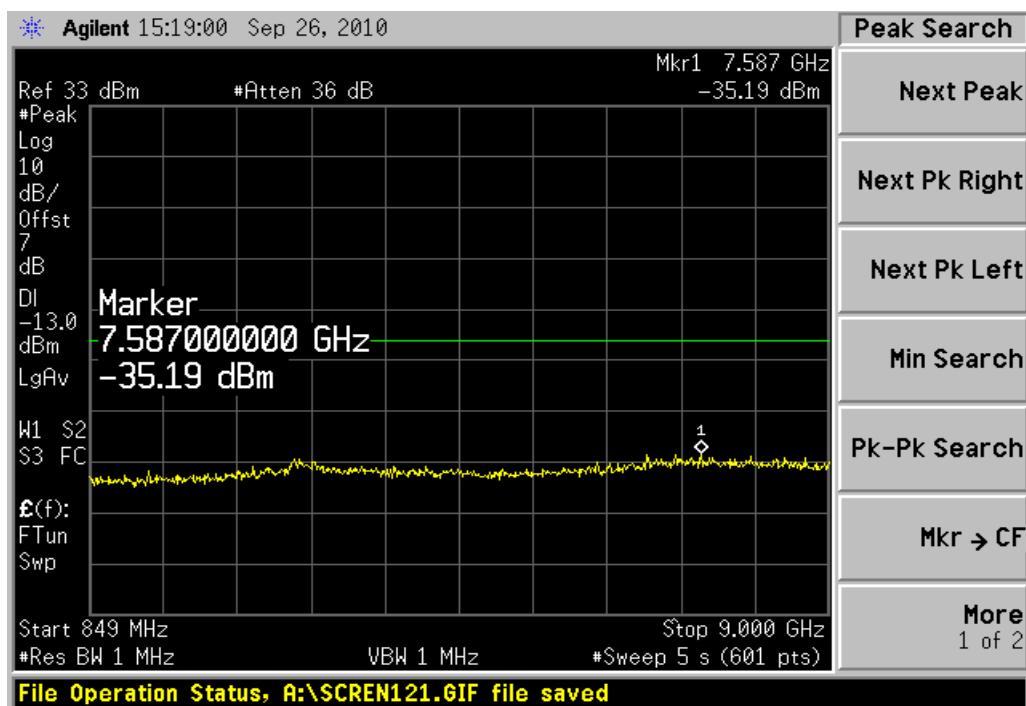


Channel 189, 30MHz~824MHz



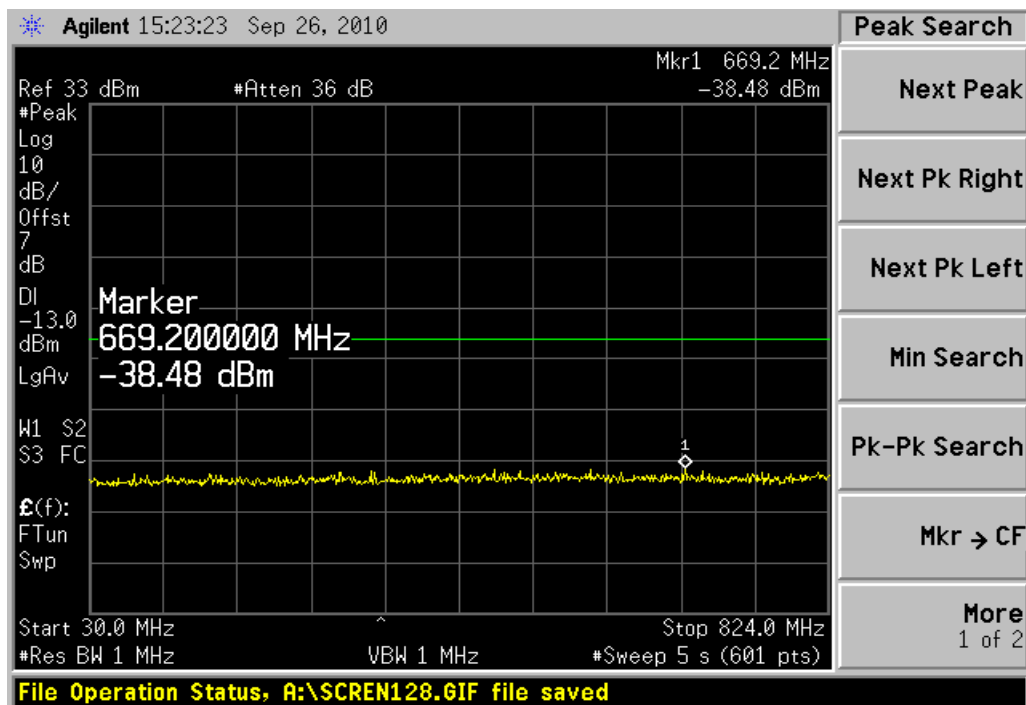
Channel 189, 824MHz~849MHz

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

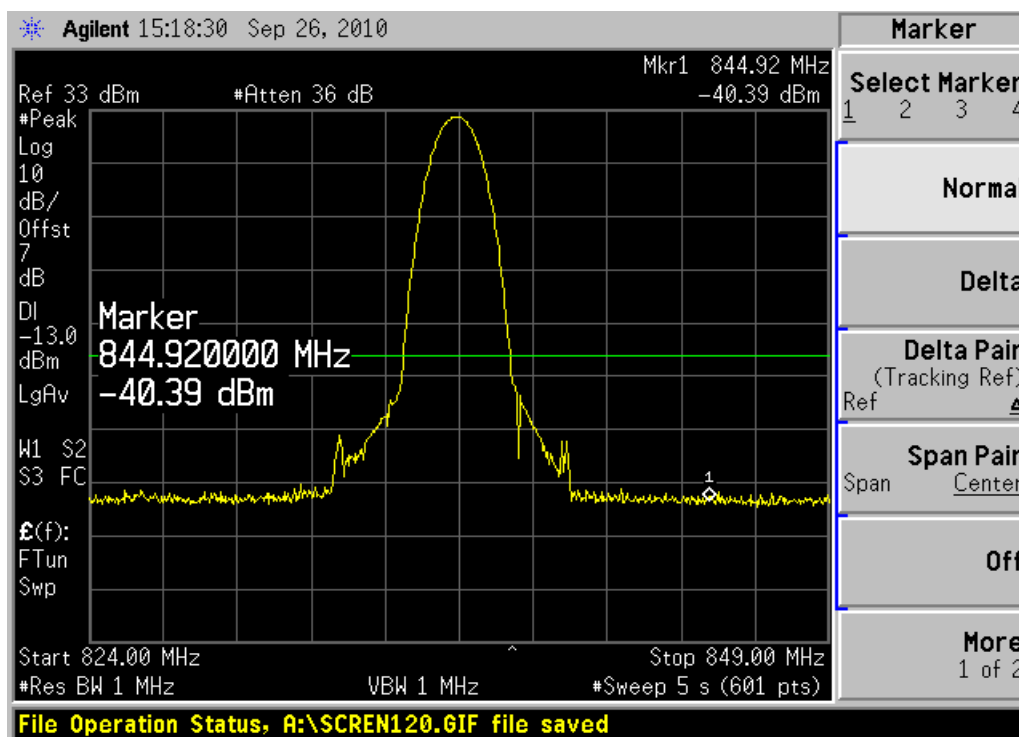


Channel 189, 849MHz~9GHz

EDGE MODE:

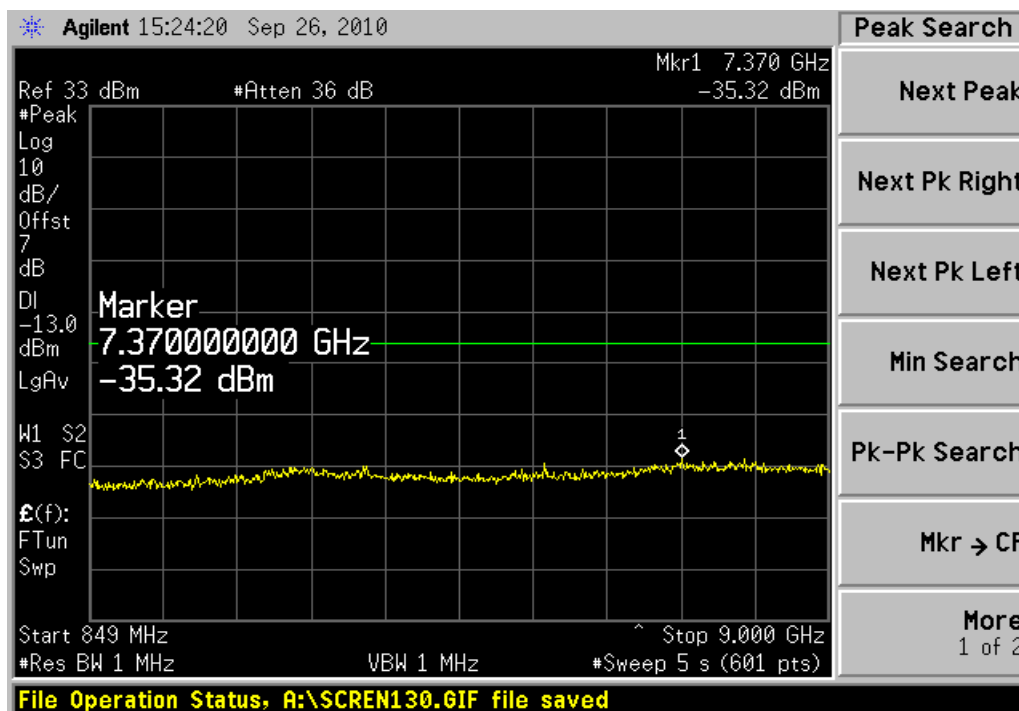


Channel 189, 30MHz~824MHz



Channel 189, 824MHz~849MHz

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



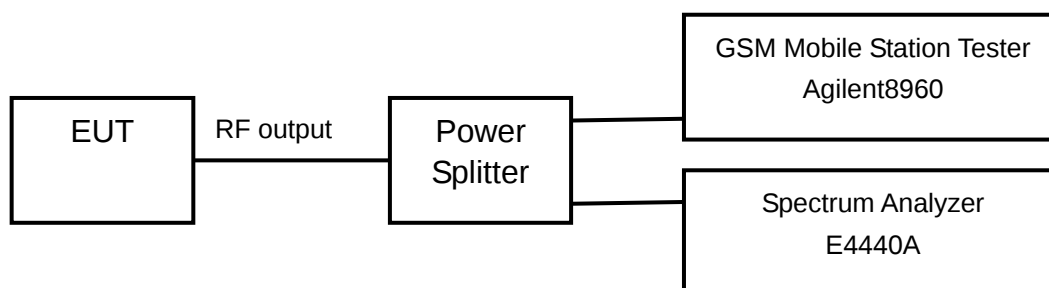
Channel 189, 849MHz~9GHz

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

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

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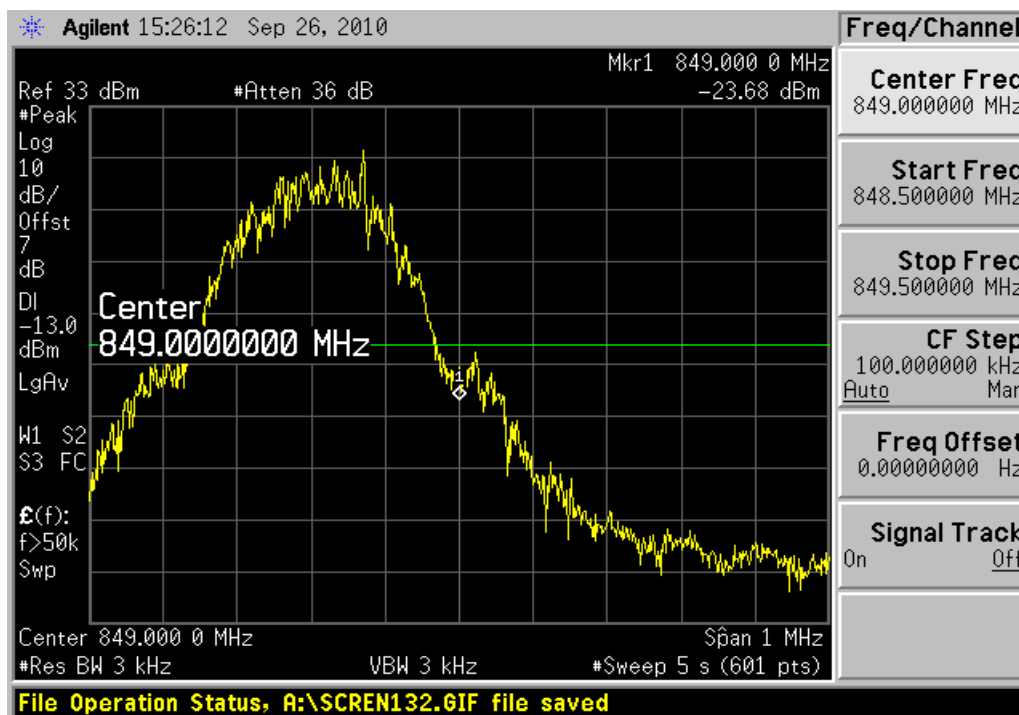
Test result:

Refer to the following figures.

GSM/GPRS MODE:

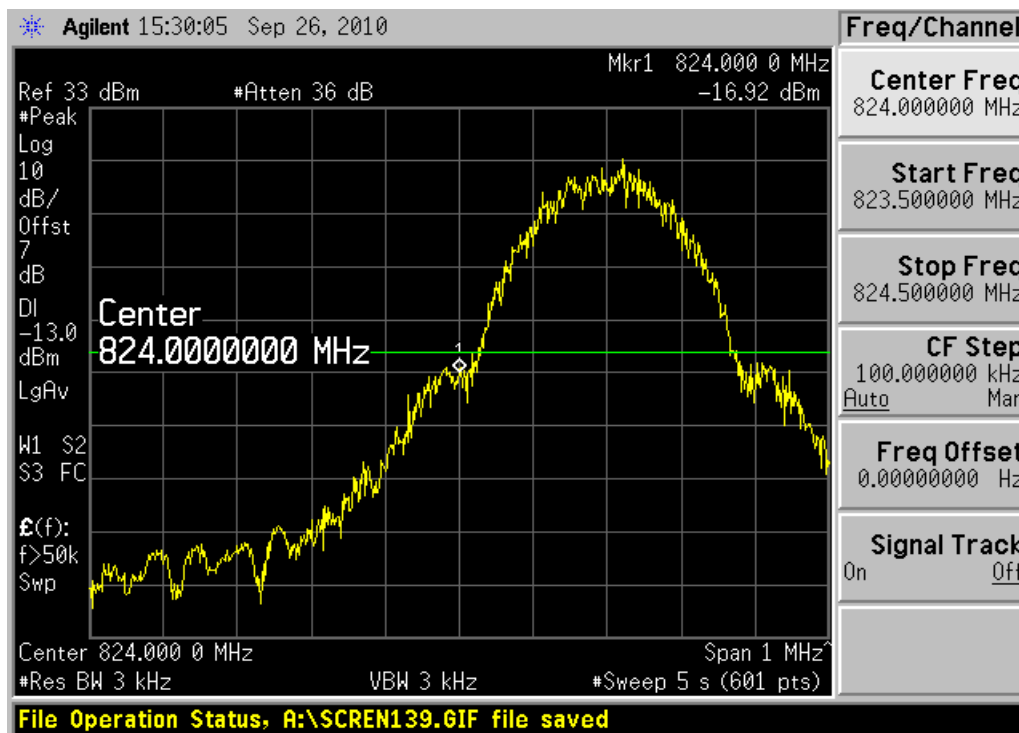


Channel 128

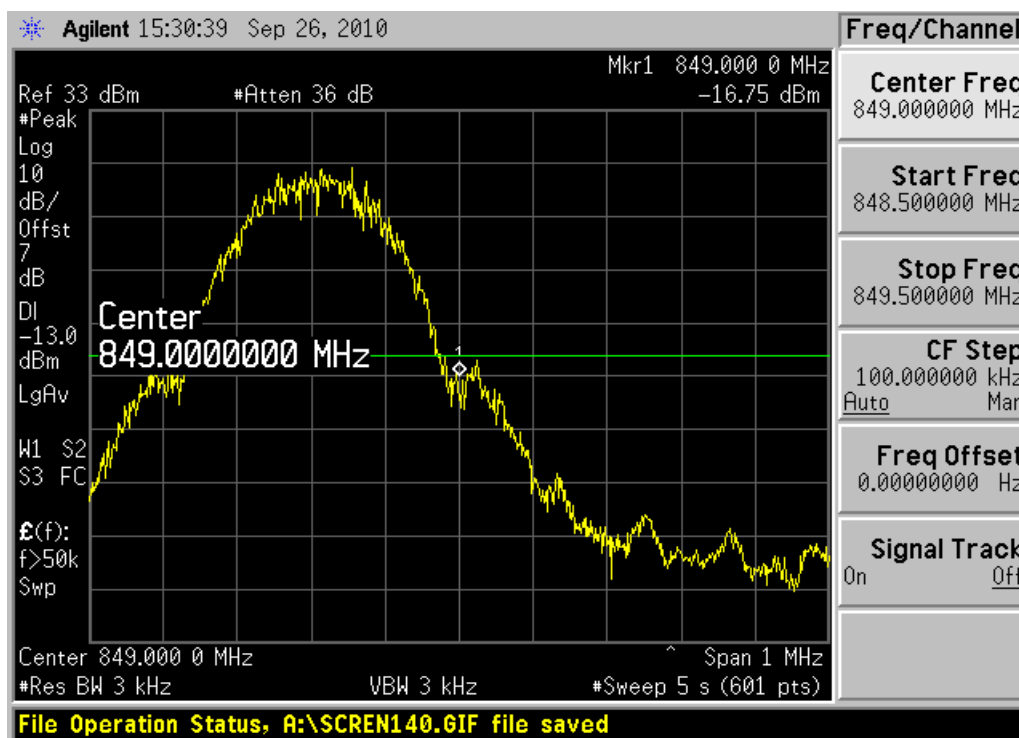


Channel 251

EDGE MODE:



Channel 128



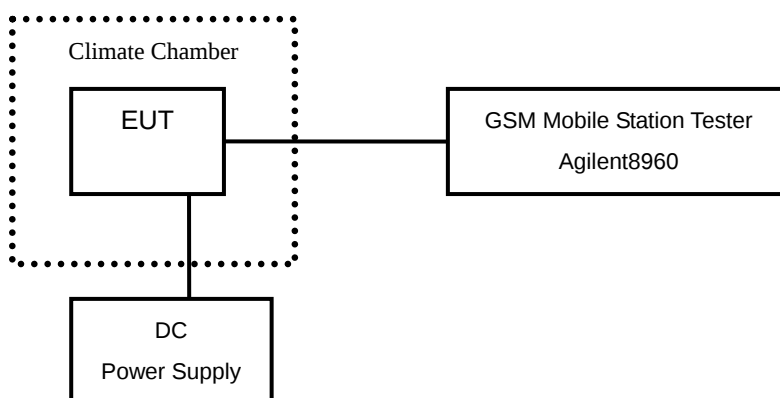
Channel 251

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

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

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 3.2 to 3.6 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)@3.3V		
	Channel 128	Channel 189	Channel 251
-30	0.046	0.046	0.044
-20	0.080	0.078	0.061
-10	0.085	0.091	0.083
0	0.066	0.060	0.056
+10	0.038	0.045	0.051
+20	0.065	0.065	0.061
+30	0.058	0.060	0.060
+40	0.044	0.043	0.041
+50	0.040	0.040	0.040

Voltage (V)	Test Result (ppm)@20°C		
	Channel 128	Channel 189	Channel 251
3.2	0.075	0.076	0.074
3.6	0.077	0.077	0.075

EDGE MODE:

Temperature(° C)	Test Result (ppm)@3.3V		
	Channel 128	Channel 189	Channel 251
-30	0.077	0.080	0.070
-20	0.089	0.084	0.082
-10	0.088	0.085	0.084
0	0.084	0.091	0.070
+10	0.089	0.083	0.082
+20	0.060	0.059	0.061
+30	0.084	0.076	0.068
+40	0.039	0.044	0.044
+50	0.051	0.059	0.050

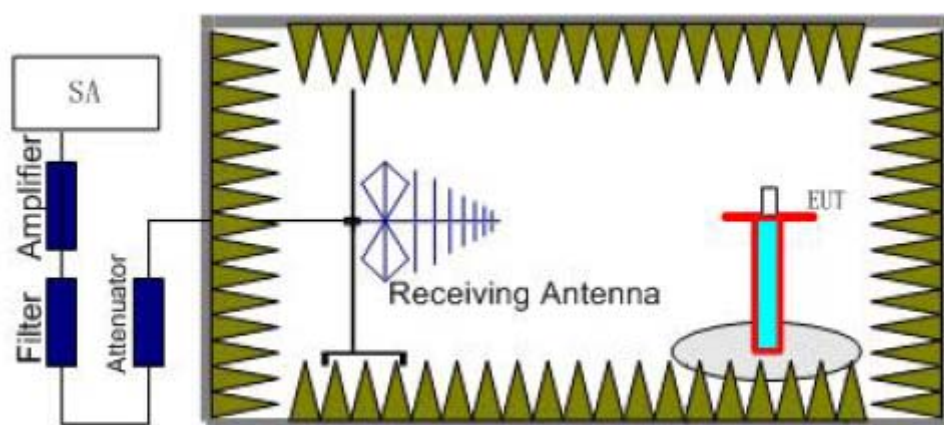
Voltage (V)	Test Result (ppm)@20°C		
	Channel 128	Channel 189	Channel 251
3.2	0.073	0.073	0.070
3.6	0.072	0.078	0.074

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

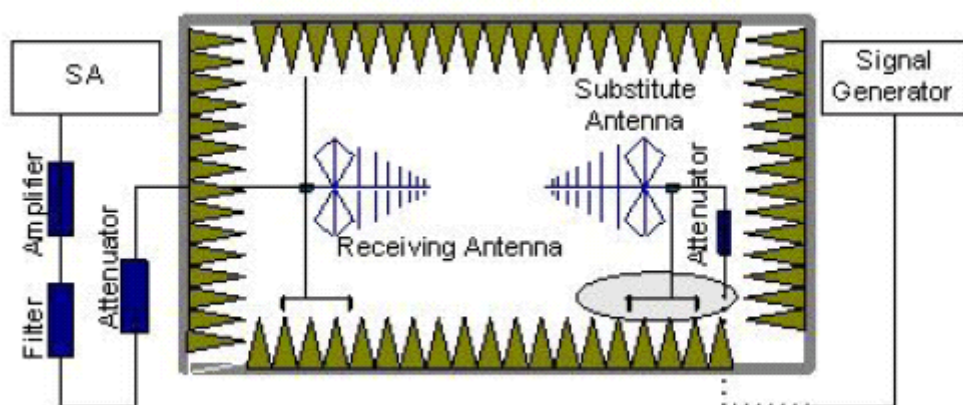
Ambient condition

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

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 9GHz (higher than the 10th 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_R: reading of the receiver (dBm)

L_C: Cable Lose (dB)

L_A: Air loss (dB)

G: Antenna Gain (dBi)

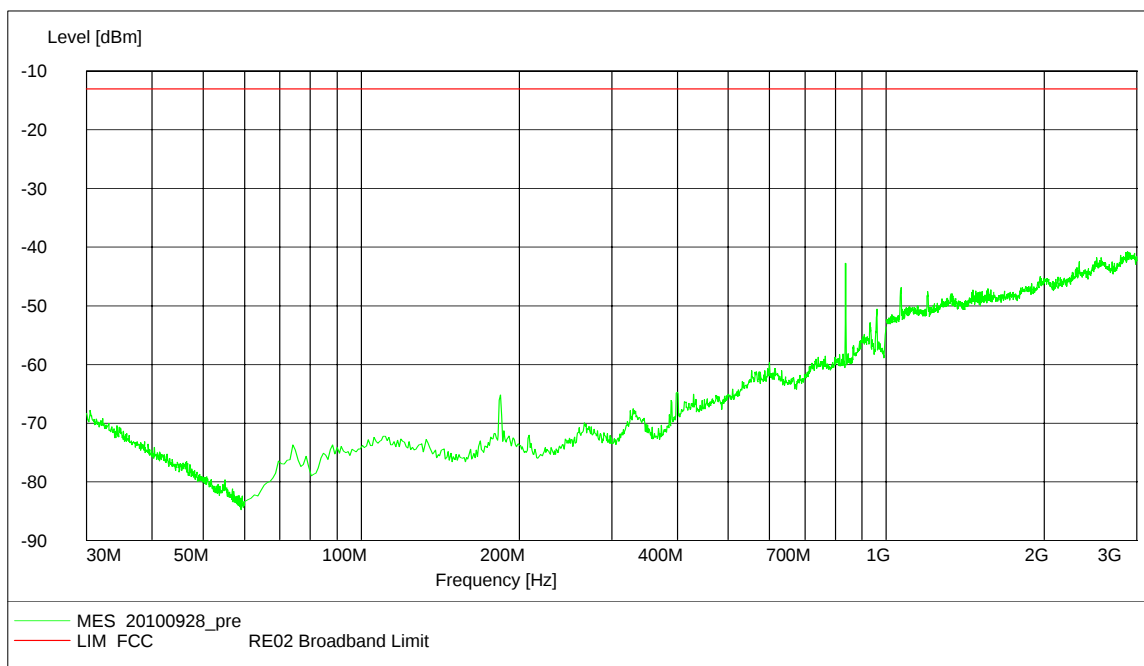
Assumed the reading of the receiver is -60dBm. A cable lose of 10dB, an air lose of 30dB and an antenna gain of 11dBi are added.

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

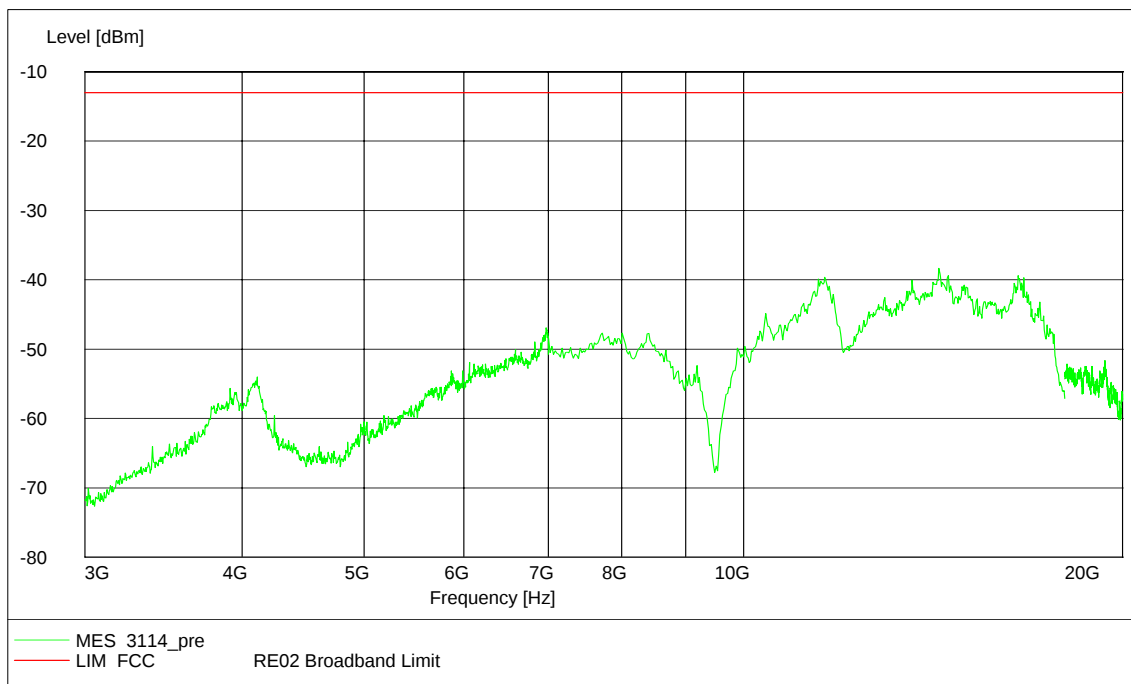
The measurement will be conducted at one channel No189 (middle channels of GSM850 band)

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

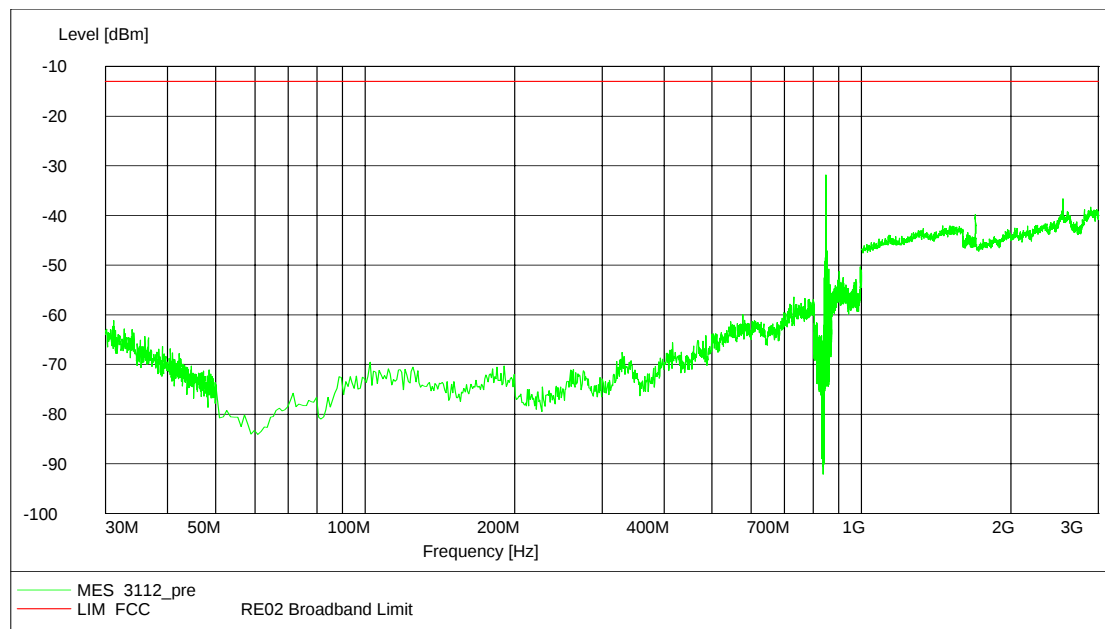


Channel 189, 30MHz~3GHz

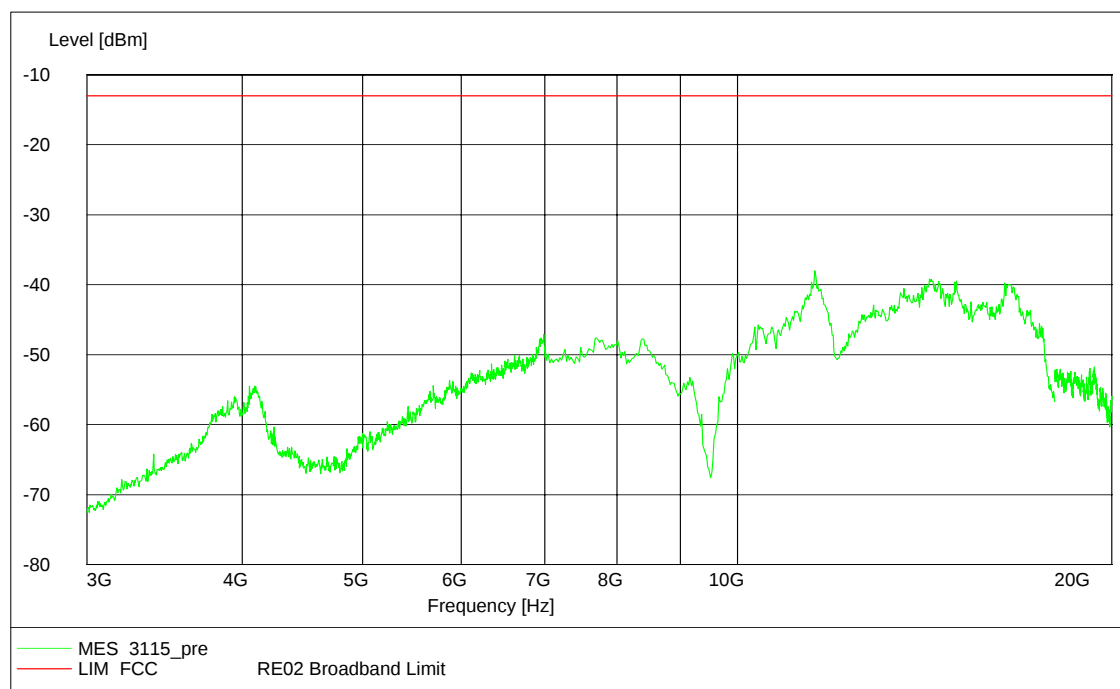


Channel 189, 3GHz~20GHz

EDGE MODE:



Channel 189, 30MHz~3GHz



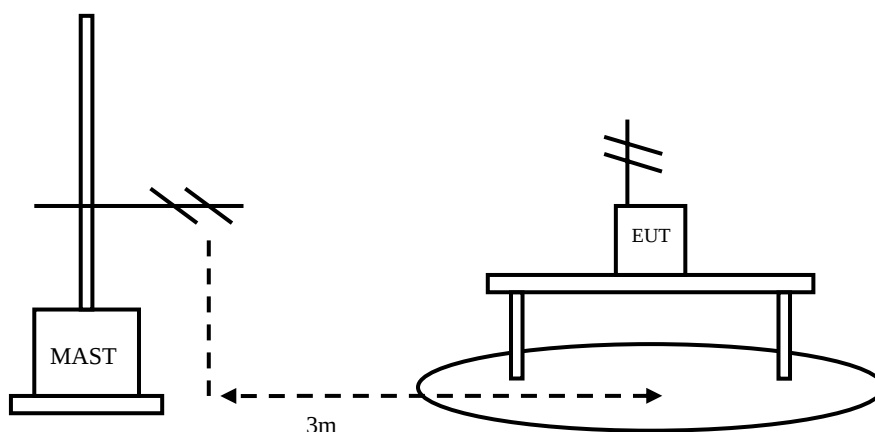
Channel 189, 3GHz~20GHz

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 accessories of the EUT are connected with the EUT such as headset etc. During the test the data transferring via USB cable between EUT and laptop is maintained.

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.

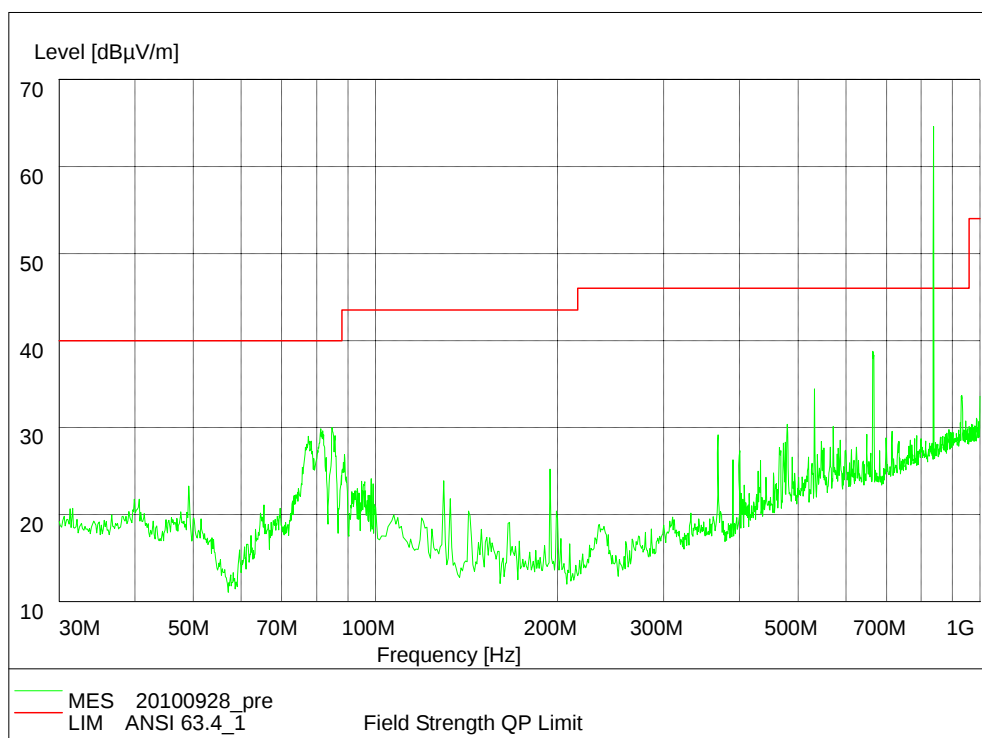
During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna.

The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.

Limit:

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

Test result:



Note: The signal beyond the limit is the base station simulator carrier.
For measurement above 1GHz, all emissions level measured were more than 10dB below the limit.

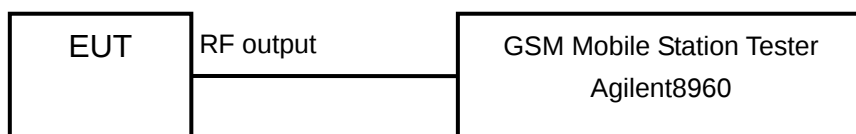
2.2.2 PCS1900

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

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

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	$\leq 30\text{dBm}$
--------	---------------------

Test result:

GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
1850.2	512	29.5
1880.0	661	29.7
1909.8	810	29.6

EDGE MODE:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
1850.2	512	25.5
1880.0	661	25.8
1909.8	810	25.8

2.2.2.2 Type of Modulation-IC RSS-133 § 6.2

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

Applicable standard:

The devices may employ any type of modulation techniques. The type of modulation used must be reported.

Test result:

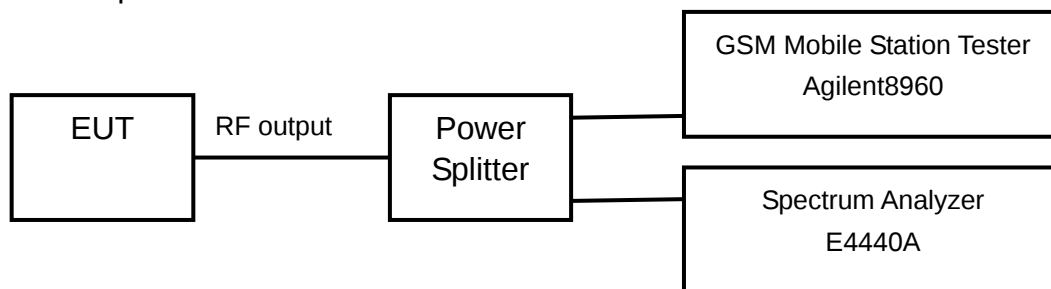
Please refer to section 1.7.1 of this report.

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

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

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:

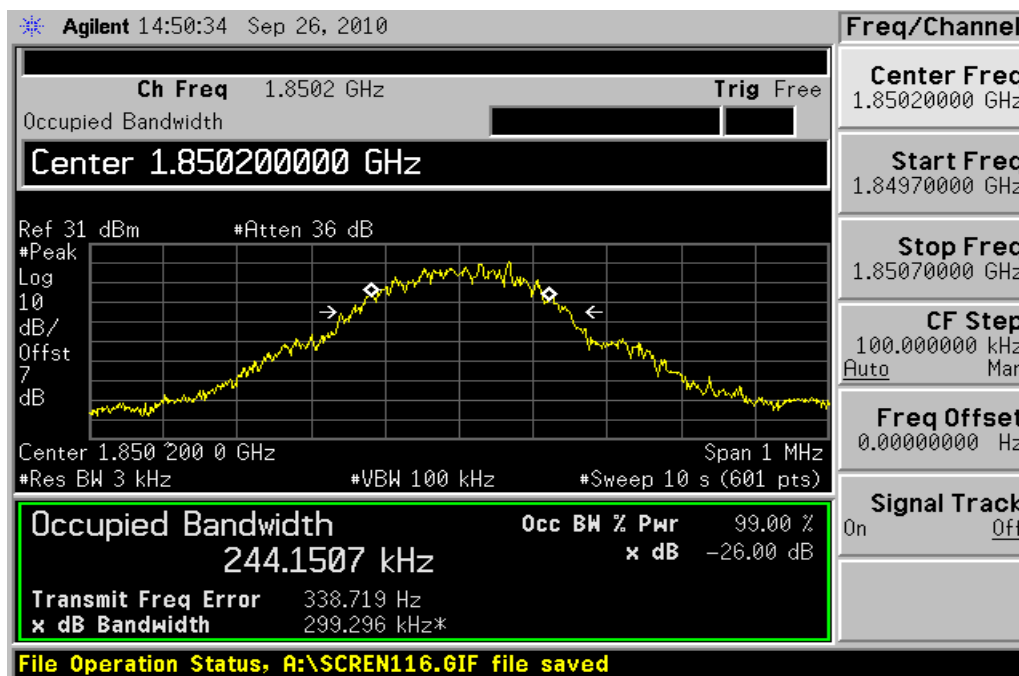
GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	244.15
1880.0	661	239.38
1909.8	810	239.77

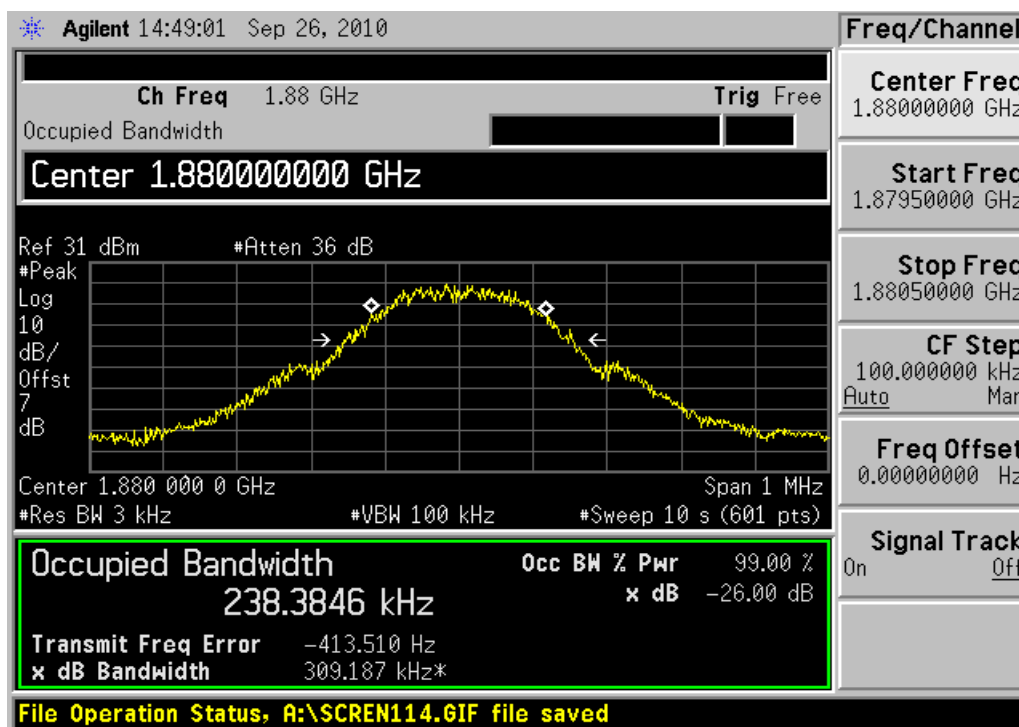
EGPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	244.15
1880.0	661	244.44
1909.8	810	244.65

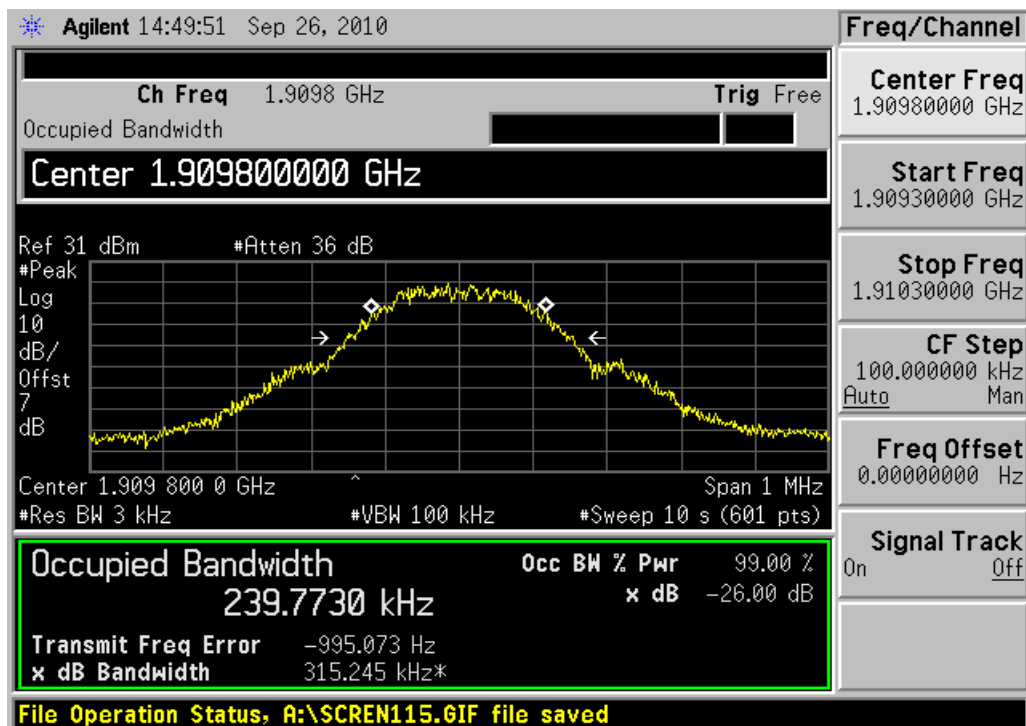
GSM/GPRS MODE:



Channel 512

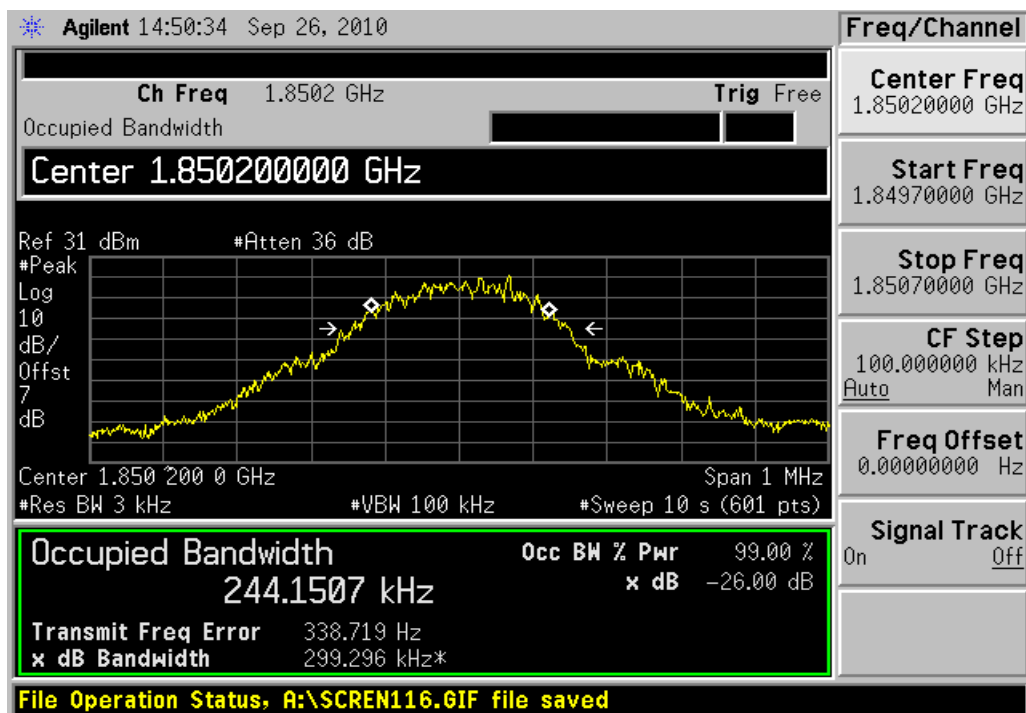


Channel 661

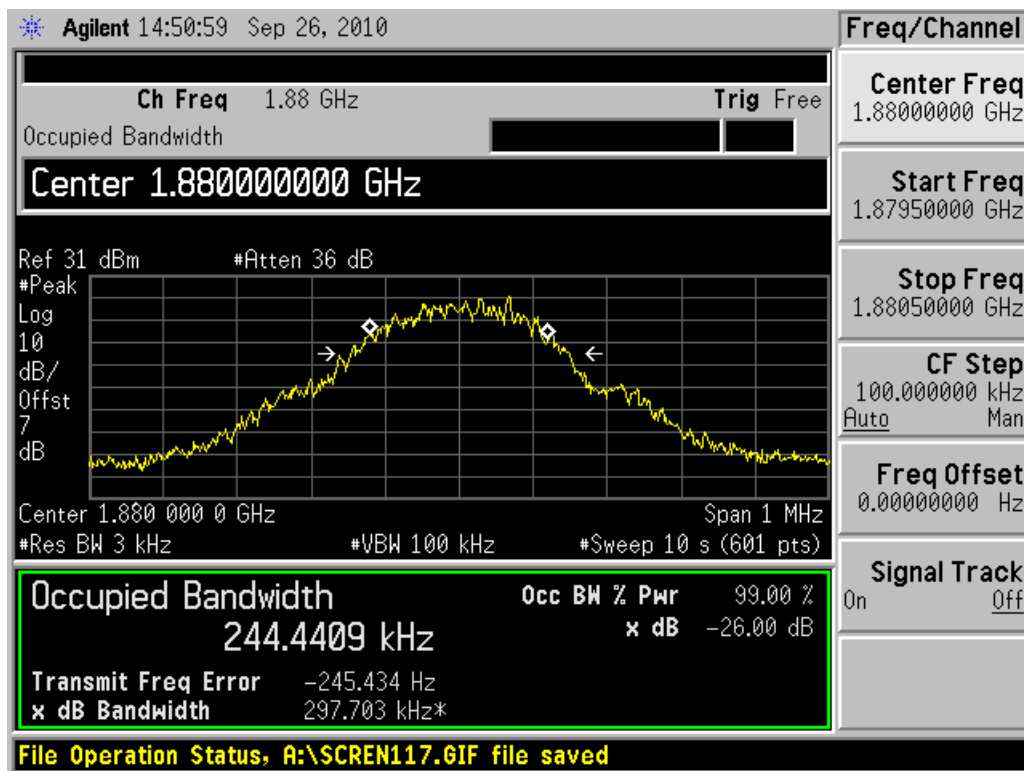


Channel 810

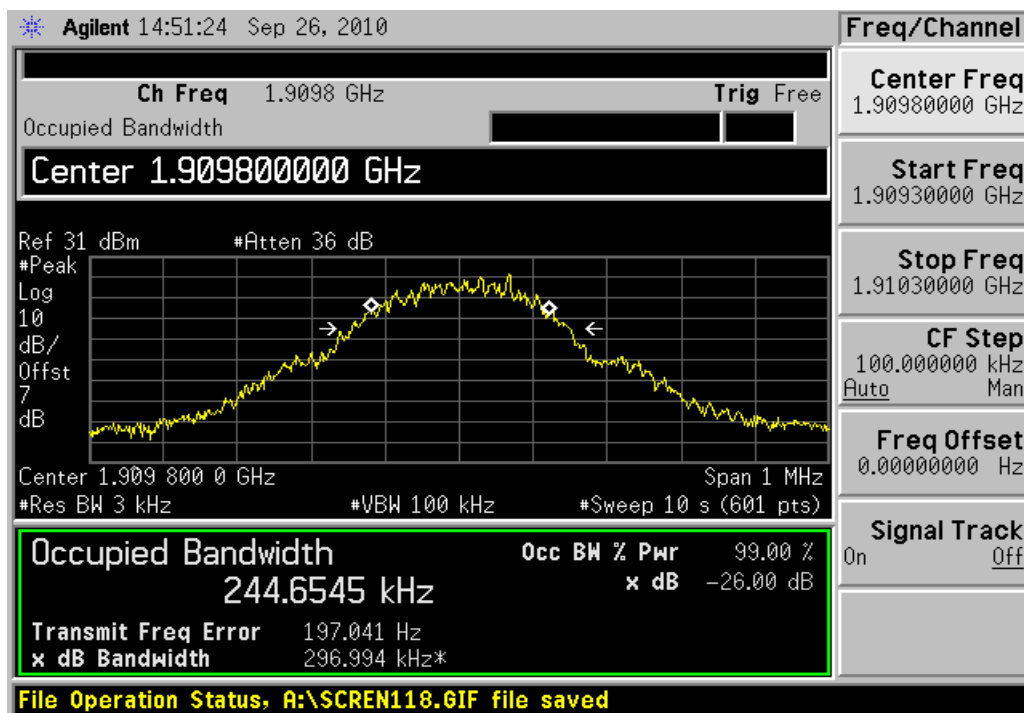
EDGE MODE:



Channel 512



Channel 661



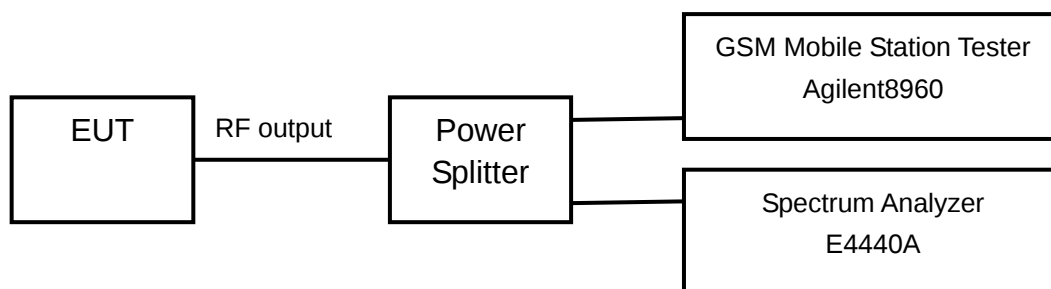
Channel 810

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

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

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 10th harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer.

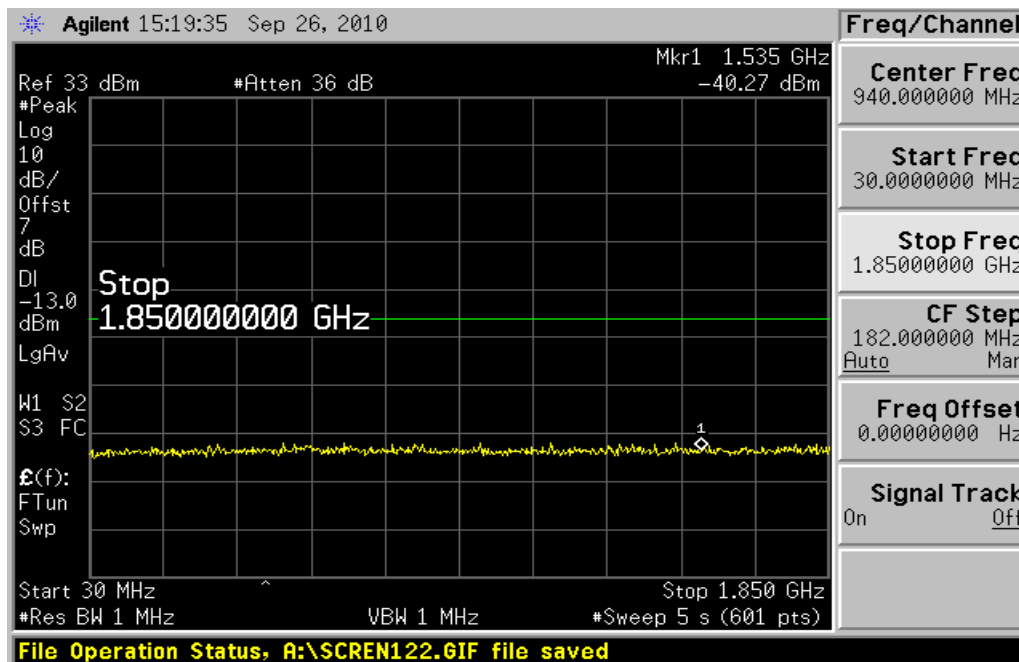
The measurement will be conducted at one channel No661 (middle channel of PCS1900 band)

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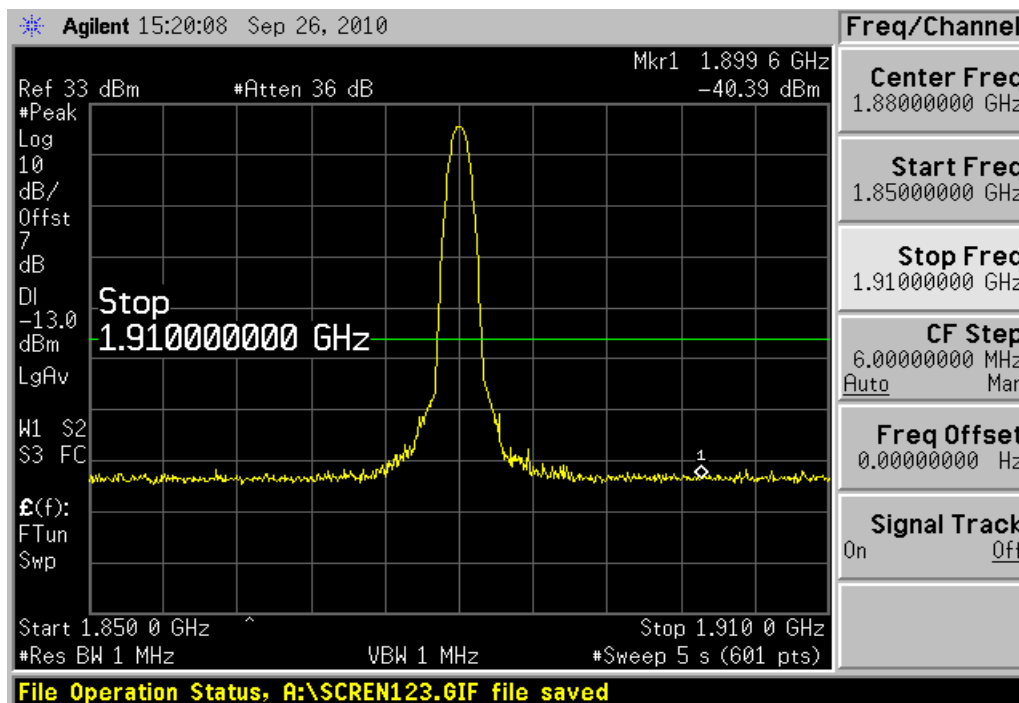
Test result:

Refer to the following figures.

GSM/GPRS MODE:

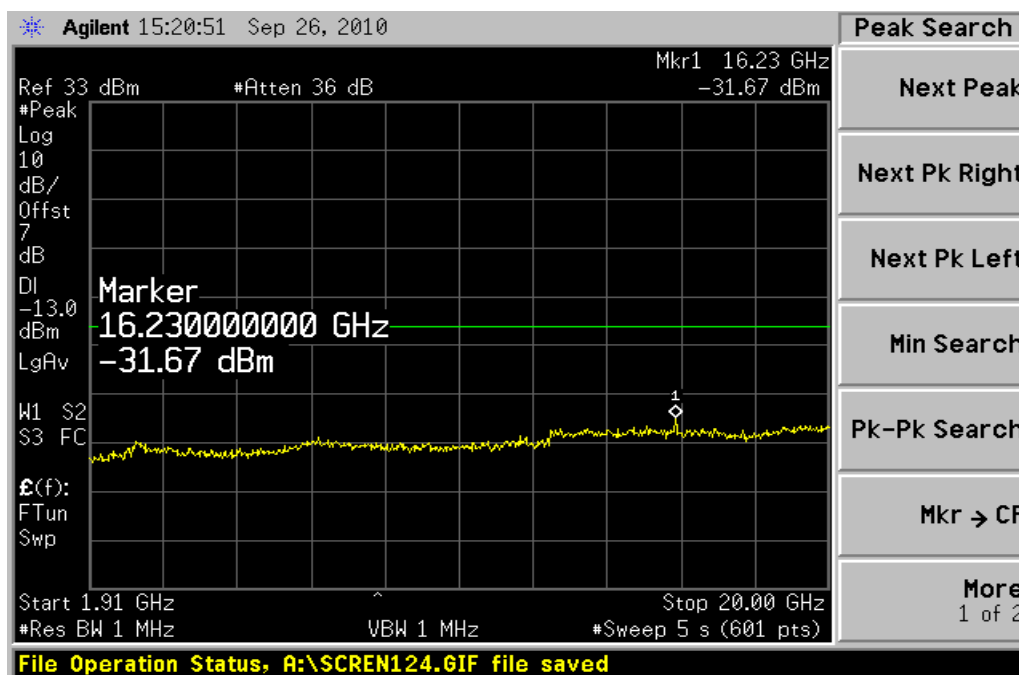


Channel 661, 30MHz~1850MHz



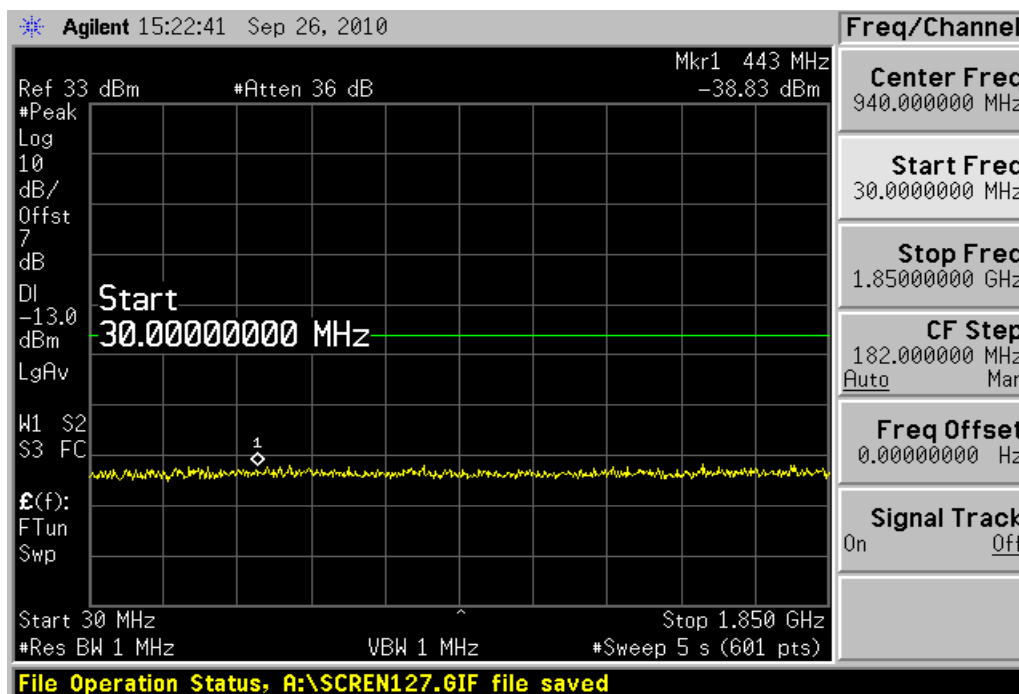
Channel 661, 1850MHz~1910MHz

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

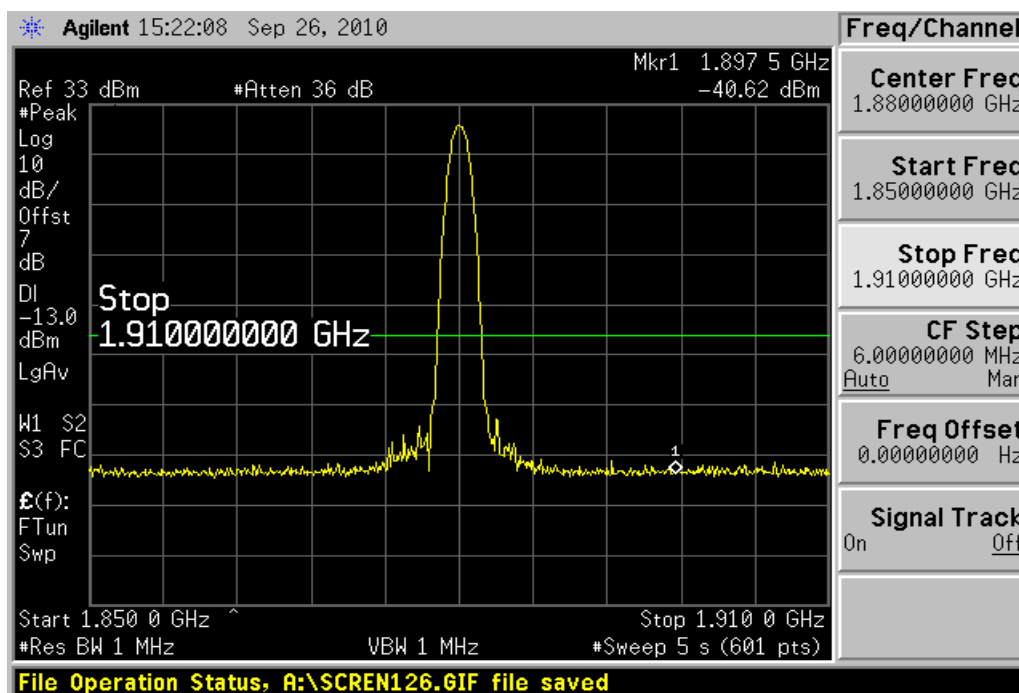


Channel 661, 1910MHz~20GHz

EDGE MODE:

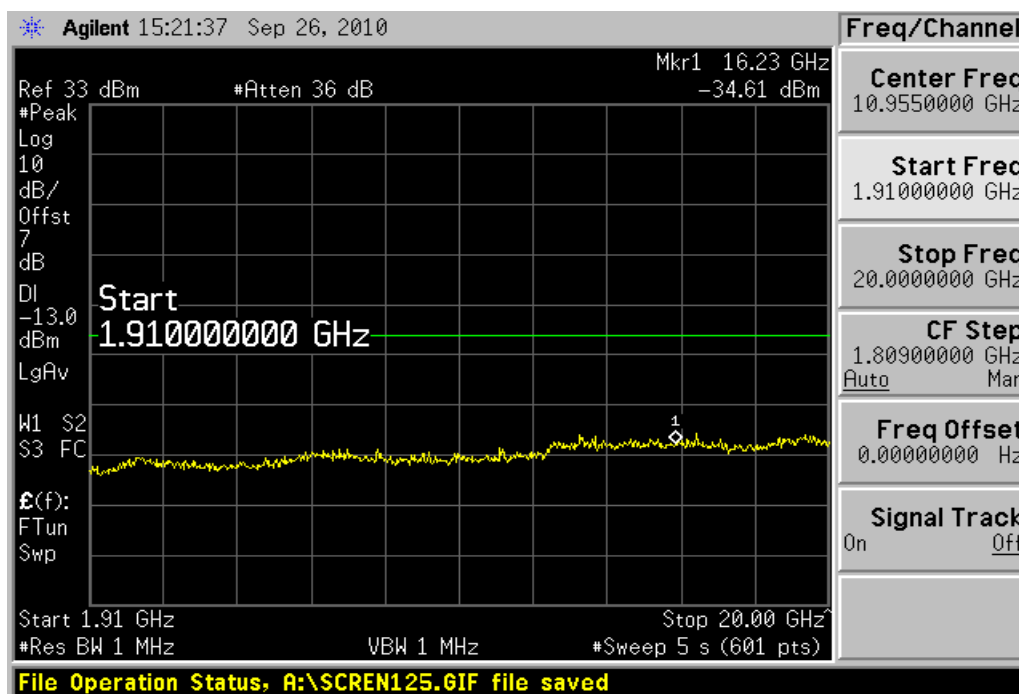


Channel 661, 30MHz~1850MHz



Channel 661, 1850MHz~1910MHz

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



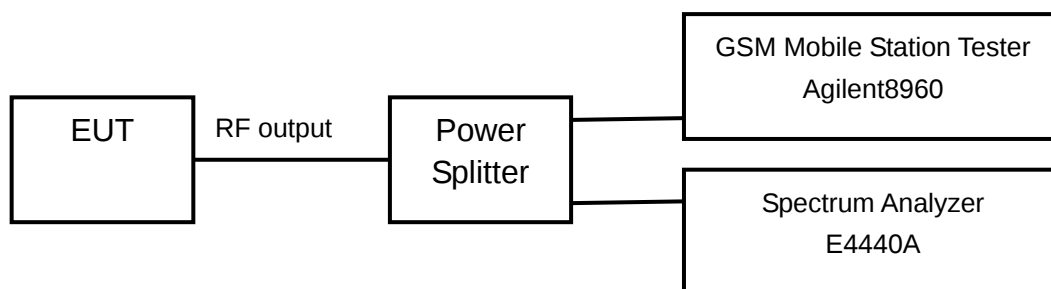
Channel 661, 1910MHz~20GHz

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

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

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.

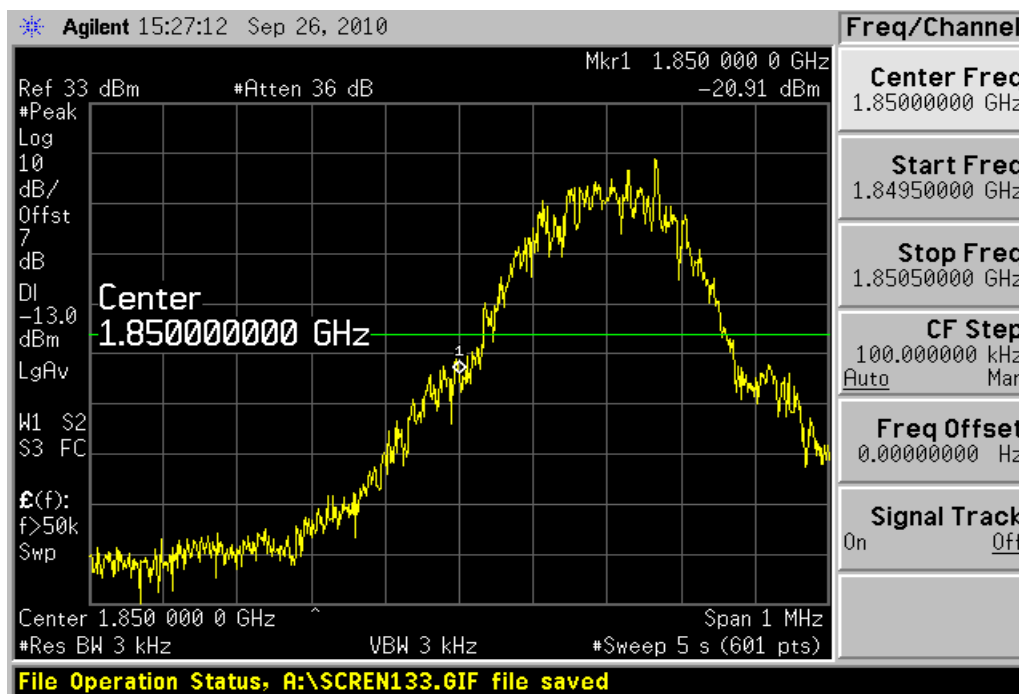
The measurement will be conducted at two channels No512 and No810 (Bottom and top channels of PCS1900 band)

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

Test result:

Refer to the following figures.

GSM/GPRS MODE:

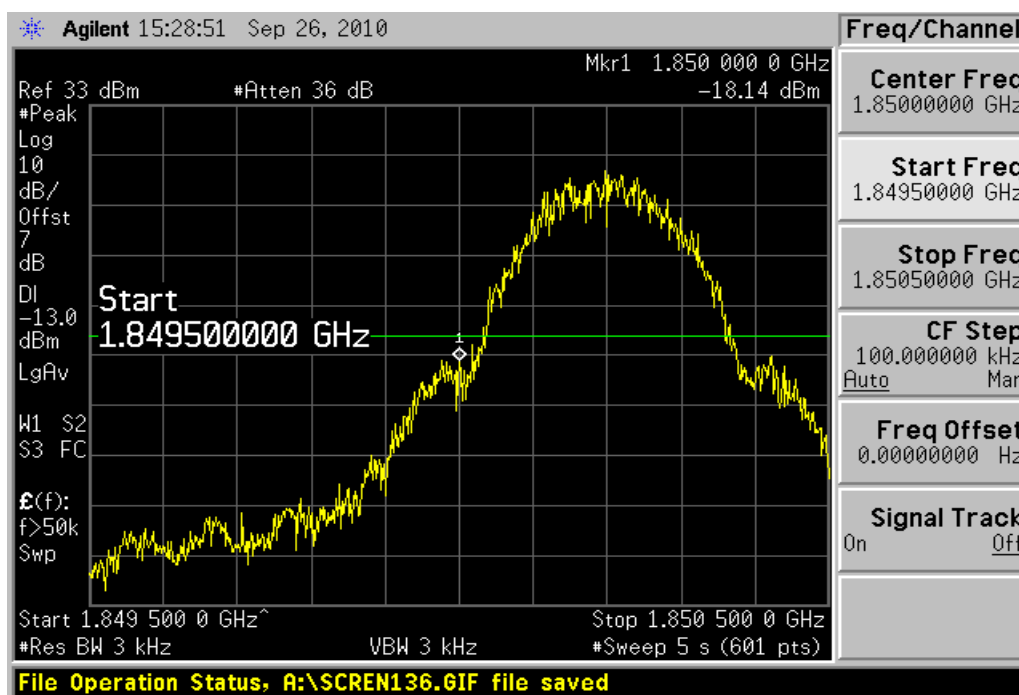


Channel 512



Channel 810

EDGE MODE:



Channel 512



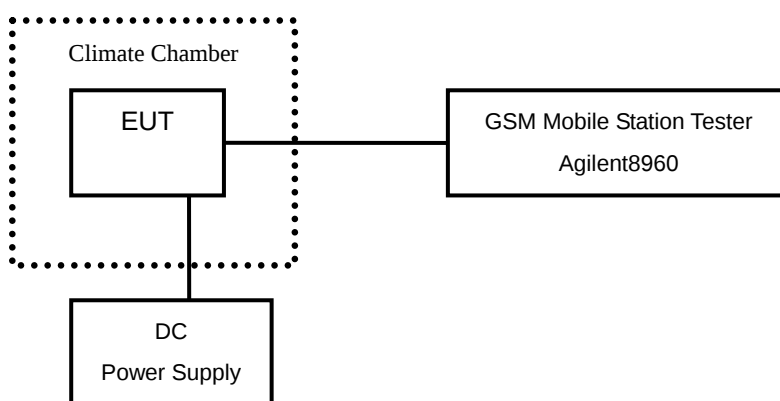
Channel 810

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

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

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 3.2 to 3.6 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)@3.3V		
	Channel 128	Channel 189	Channel 251
-30	0.024	0.023	0.024
-20	0.020	0.031	0.031
-10	0.008	0.010	0.011
0	0.027	0.036	0.032
+10	0.014	0.009	0.006
+20	0.028	0.037	0.027
+30	0.025	0.024	0.022
+40	0.020	0.020	0.016
+50	0.018	0.018	0.017

Voltage (V)	Test Result (ppm)@20°C		
	Channel 128	Channel 189	Channel 251
3.2	0.029	0.025	0.032
3.6	0.034	0.035	0.083

EDGE MODE:

Temperature(° C)	Test Result (ppm)@3.3V		
	Channel 128	Channel 189	Channel 251
-30	0.035	0.031	0.029
-20	0.040	0.037	0.018
-10	0.031	0.037	0.038
0	0.039	0.036	0.034
+10	0.090	0.031	0.033
+20	0.018	0.019	0.018
+30	0.024	0.021	0.023
+40	0.019	0.019	0.016
+50	0.011	0.012	0.014

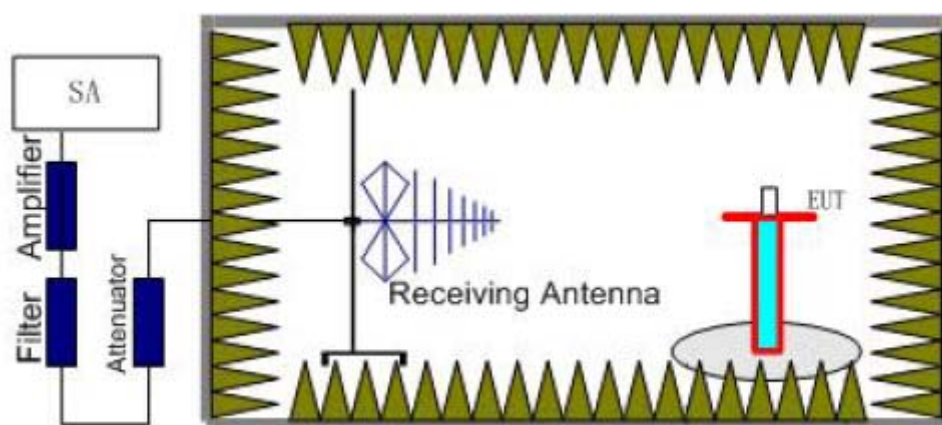
Voltage (V)	Test Result (ppm)@20°C		
	Channel 128	Channel 189	Channel 251
3.2	0.017	0.018	0.022
3.6	0.019	0.018	0.024

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

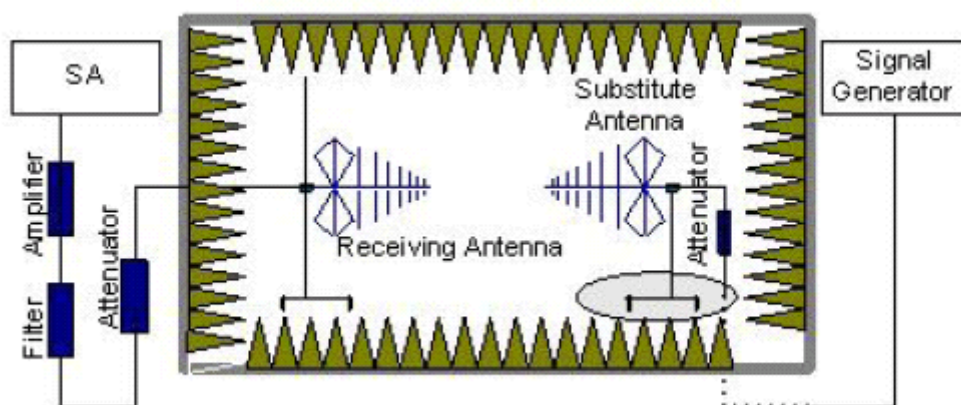
Ambient condition

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

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 10th 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_R: reading of the receiver (dBm)

L_C: Cable Lose (dB)

L_A: Air loss (dB)

G: Antenna Gain (dBi)

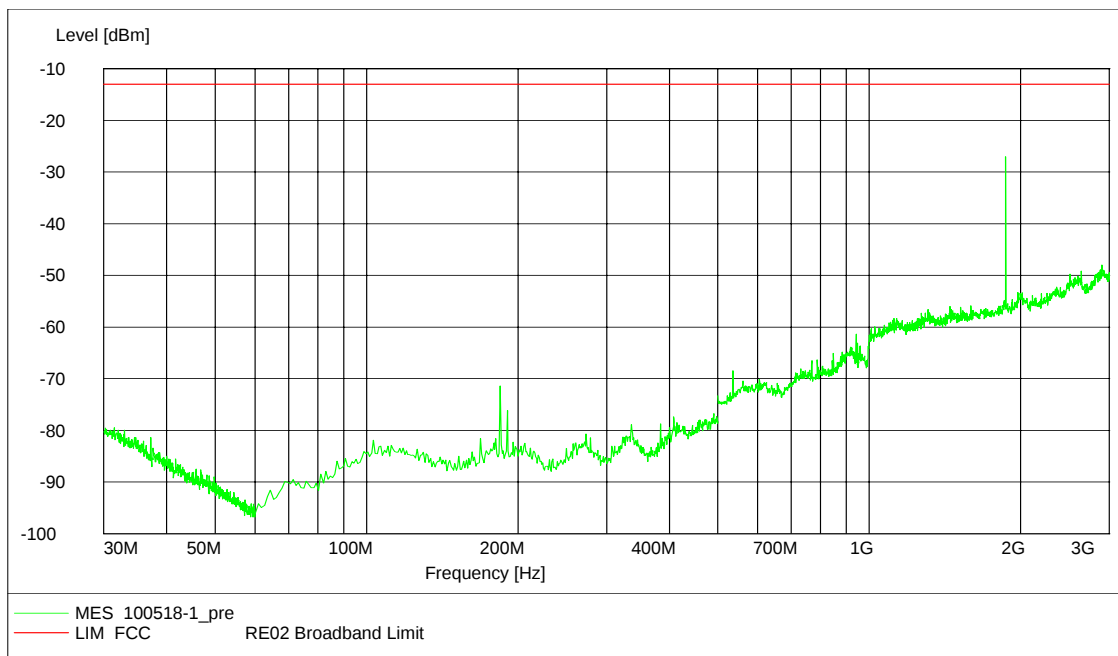
Assumed the reading of the receiver is -60dBm. A cable lose of 10dB, an air lose of 30dB and an antenna gain of 11dBi are added.

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

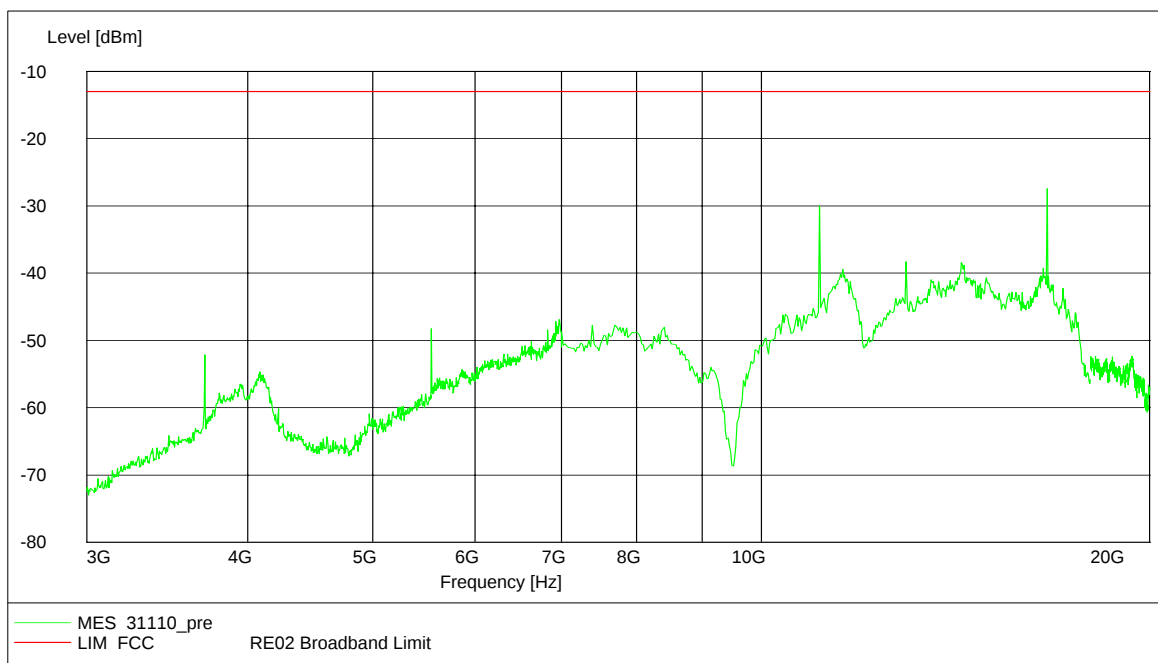
The measurement will be conducted at one channel No661 (middle channels of PCS1900 band).

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

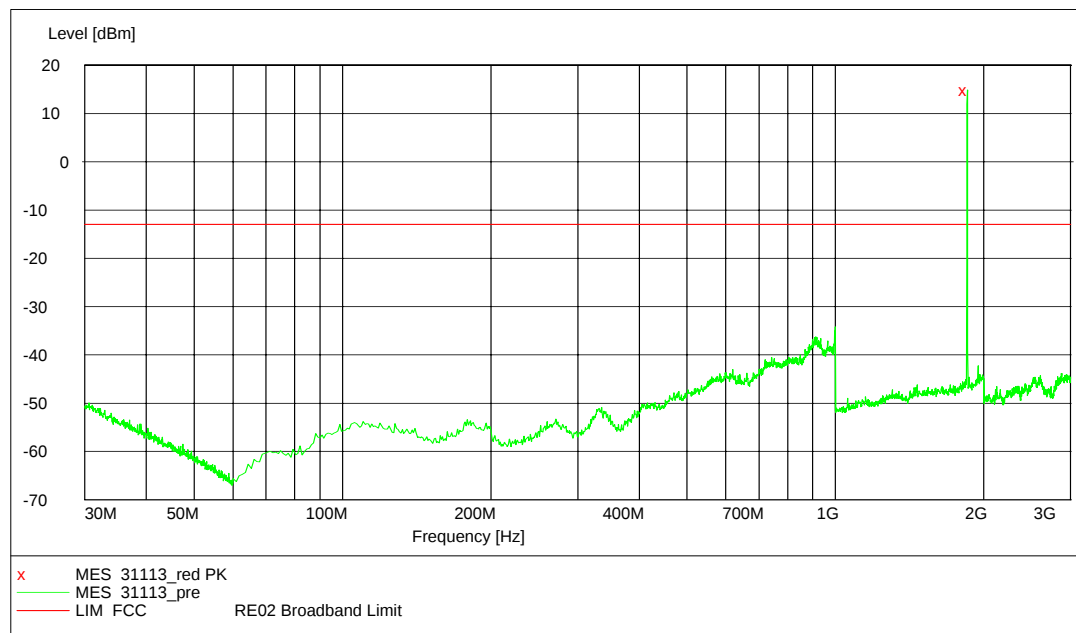


Channel 661, 30MHz~3GHz

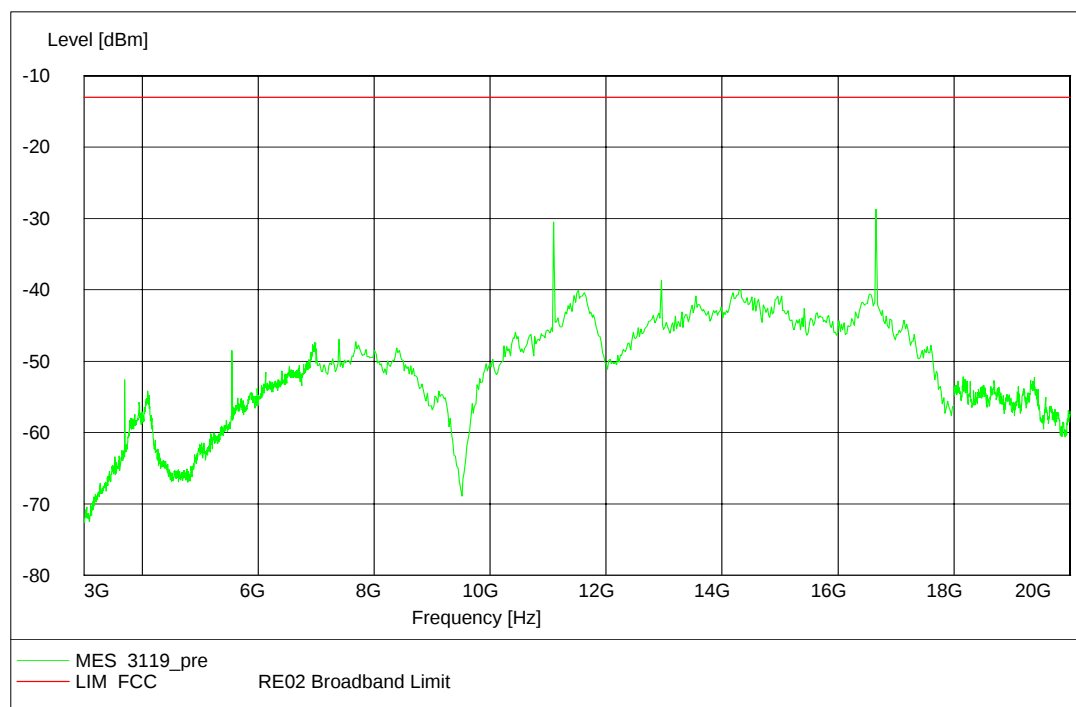


Channel 661, 3GHz~20GHz

EDGE MODE:



Channel 661, 30MHz~3GHz



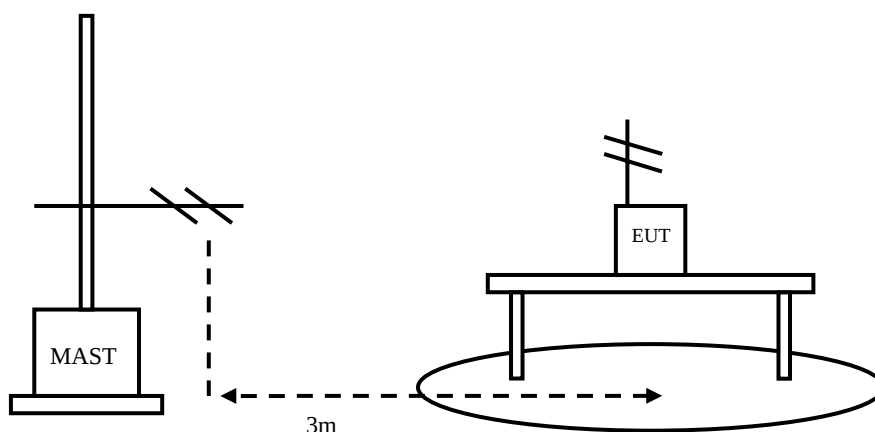
Channel 661, 18GHz~20GHz

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 accessories of the EUT are connected with the EUT such as headset etc. During the test the data transferring via USB cable between EUT and laptop is maintained.

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.

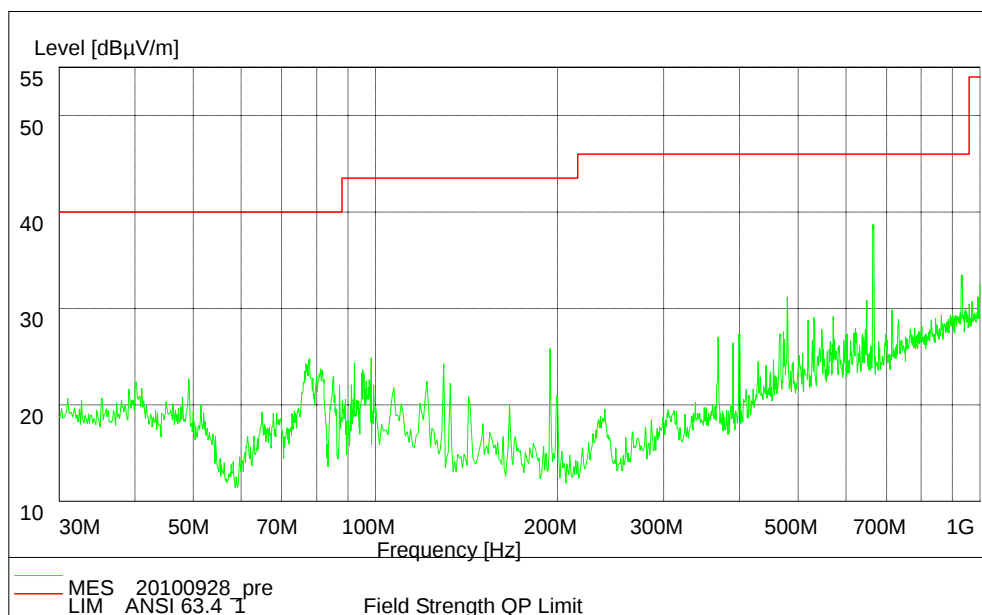
During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna.

The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.

Limit:

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

Test result:



PCS 1900

Note: For measurement above 1GHz, all emissions level measured were more than 10dB below the limit.

2.3. List of test equipments

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

2.4. EUT Photograph

The front view of EUT (with docking card)

The rear view of EUT (with docking card)

The front view of EUT

The rear view of EUT

Appendix

Appendix1 Test Setup