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# TEST REPORT

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Report No.: SRTC2011-H024-E0011

Product Name: GSM/GPRS/EDGE/WCDMA

Digital Mobile Phone with Bluetooth

Marketing Name: one touch 905A

Product Model: MINI3G A

Applicant: TCT Mobile Limited

Manufacture: TCT Mobile Limited

Specification: FCC Part 24E, Part 22H, Part 2

(October 1, 2009 edition)

FCC ID: RAD153

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

No.80 Beilishi Road Xicheng District Beijing, China

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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)  
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City: Beijing  
Country or Region: China  
Contacted person: Wang Junfeng  
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Email: wangjf@srrc.org.cn / wangjunfeng@srtc.org.cn

### 1.3 Applicant's details

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

### 1.4 Manufacturer's details

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

## 1.5 Application details

Date of reception of test sample: 16<sup>th</sup> Feb 2011

Date of test: 24<sup>th</sup> Feb 2011 to 6<sup>th</sup> May 2011

## 1.6 Reference specification

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

## 1.7 Information of EUT

### 1.7.1 General information

Name of EUT	GSM/GPRS/EDGE/WCDMA Digital Mobile Phone with Bluetooth
FCC ID	RAD153
Frequency range	WCDMA Band II: Tx:1850~1910MHz      Rx:1930~1990MHz WCDMA Band V: Tx:824~849MHz      Rx:869~894MHz
Rated output power	WCDMA Band II:24.0dBm WCDMA Band V:24.0dBm
Modulation type	QPSK
Emission Designator	4M50F9W
Duplex mode	FDD
Duplex spacing:	WCDMA Band II:80MHz WCDMA Band V:45MHz
Antenna type	Integral
Power Supply	Battery or charger
Rated Power Supply Voltage	3.8V
Extreme Temperature	Lowest: -30°C Highest: +50°C
Extreme Voltage	Minimum: 3.5V Maximum: 4.2V
HW Version	PIO
SW Version	sw132

### 1.7.2 EUT details

Product Name	Marketing Name	Product Model	IMEI
GSM/GPRS/EDGE/WCDMA Digital Mobile Phone with Bluetooth	one touch 905A	MINI3G A	EUT 1: 012525000006736 EUT 2: 012525000008526

### 1.7.3 Auxiliary equipment details

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

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

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

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

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

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

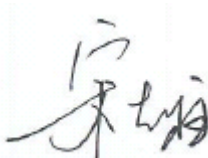
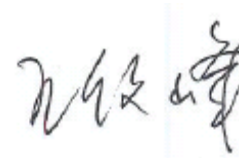

Note: As the information described above, there are two different models of charger manufactured by two different companies, and two different models of battery manufactured by two different companies.

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

## 2. Test information

### 2.1 Summary of the test results

No.	Test case	FCC reference	Verdict
1	RF Power Output	22.913(a)/24.232(b)	Pass
2	Effective Isotropic Radiated Power	22.913(a)/24.232(b)	Pass
3	Occupied Bandwidth	2.1049(h)(i)	Pass
4	Emission Bandwidth	22.917(b)/24.238(b)	Pass
5	Spurious Emissions at antenna terminals	2.1057/22.917/24.238	Pass
6	Band Edges Compliance	22.917(b)/24.238(b)	Pass
7	Frequency Stability	2.1055	Pass
8	Radiated Spurious Emissions	2.1051/22.917/24.238	Pass

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

## 2.2 Test result

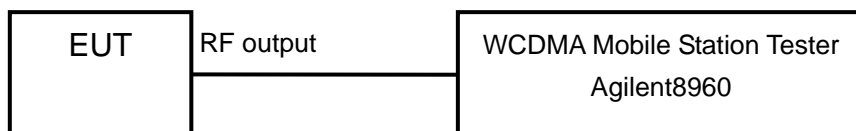
### 2.2.1 WCDMA Band II

#### 2.2.1.1 RF Power Output-FCC Part 24.232(b)

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 No9262, No9400 and No9538 (Bottom, middle and top channels of WCDMA band II)

Limits	≤24dBm
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Test result:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
1852.4	9262	22.8
1880.0	9400	23.2
1907.6	9538	22.9

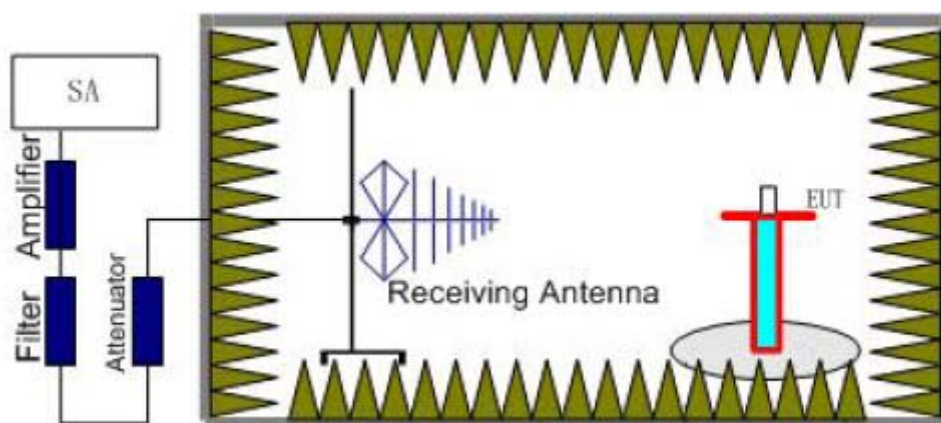


### 2.2.1.2 Effective Radiated Power-FCC Part 24.232(b)

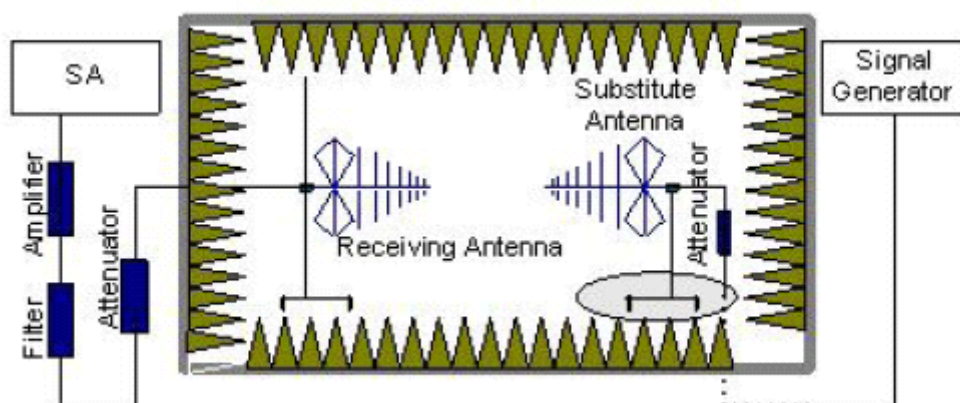
Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

Test setup:



Step 1



Step 2

Test procedure:

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

Step 1:

The measurement is carried out in the fully anechoic chamber. EUT was placed on a 2.4 meters high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. The height of receiving antenna is 2.4m and varies in certain range to find the maximum power value. A radio link shall be

established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used and RBW is set to 3MHz. Then the antenna height and turn table rotation is adjusted till the maximum power value is founded on spectrum analyzer or receiver. And the maximum value of the receiver should be recorded as (Pr).

**Step 2:**

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

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

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

The measurement results are obtained as described below:

$$\text{Power (EIRP)} = P_{\text{mea}} + P_{\text{ca}} + G_{\text{a}}$$

The measurement will be done at three channels No9262, No9400 and No9538 (Bottom, middle and top channels of WCDMA band II).

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

Frequency (MHz)	Peak EIRP(dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Polarization
1852.4	23.4	-4.8	8.6	19.6	Vertical
1880.0	23.7	-4.8	8.6	19.9	Vertical
1907.6	23.6	-4.8	8.6	19.8	Vertical

Frequency: 1880.0MHz

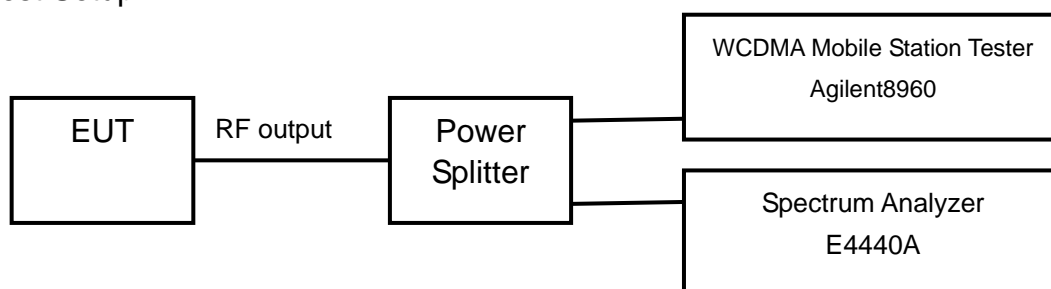
$$\text{Peak ERP (dBm)} = P_{\text{mea}} (19.9\text{dBm}) + P_{\text{ca}} (-4.8\text{dB}) + G_{\text{a}} (8.6\text{dB}) = 23.7 \text{ dBm}$$

### 2.2.1.3 Occupied Bandwidth-FCC Part 2.1049(h)(i)

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

Test Setup:



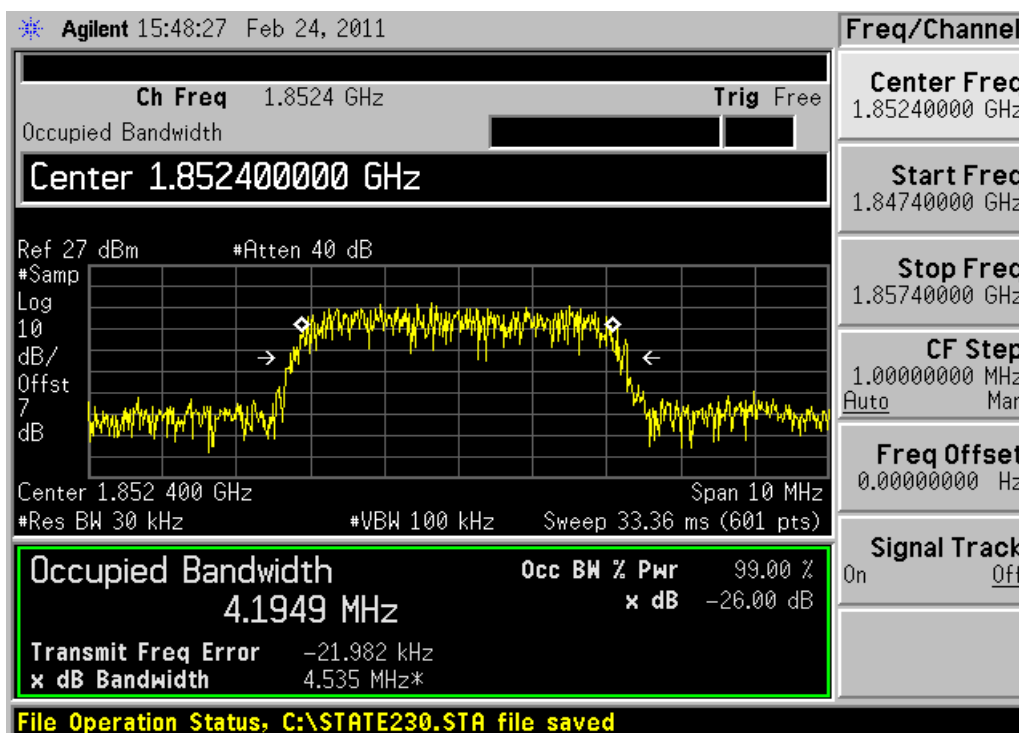
Test procedure:

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 30kHz on spectrum analyzer. The bandwidth of 99% power can be read on spectrum analyzer. The measurement will be conducted at three channels No9262, No9400 and No9538 (Bottom, middle and top channels of WCDMA band II)

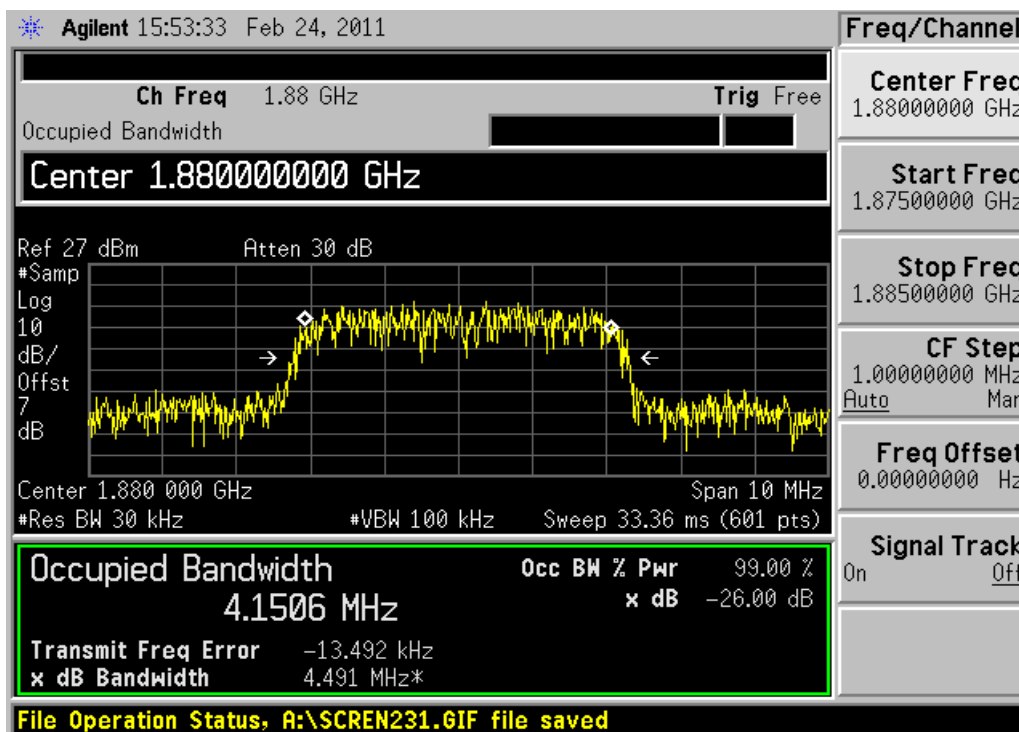
Limits: No specific occupied bandwidth requirements in part 2.1049

Test result:

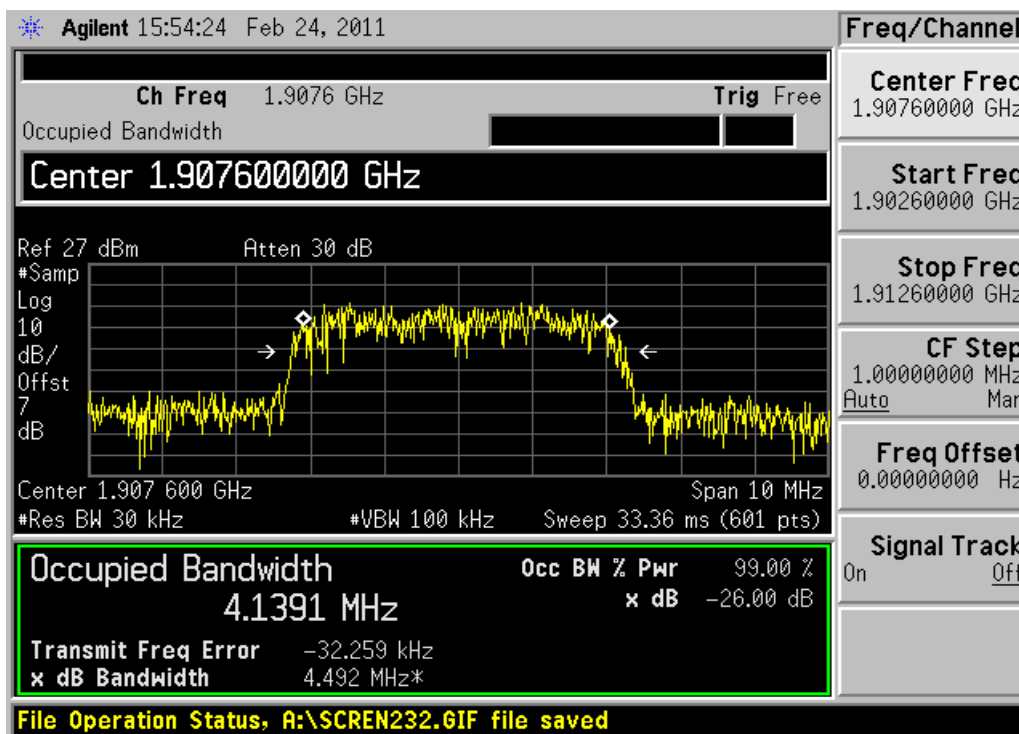
Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (MHz)
1852.4	9262	4.1949
1880.0	9400	4.1506
1907.6	9538	4.1391



Channel 9262



Channel 9400



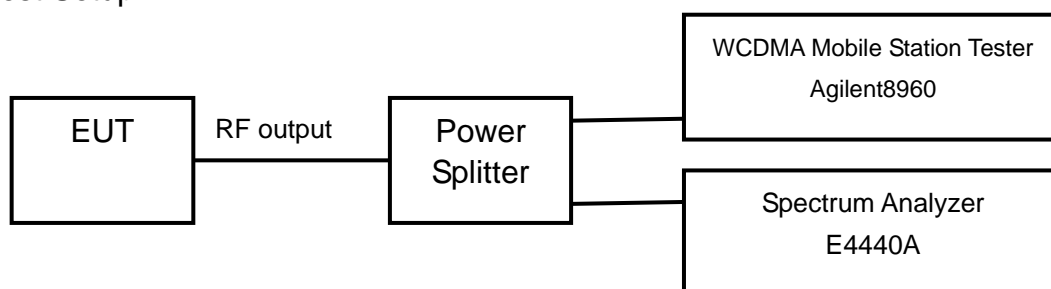
Channel 9538

### 2.2.1.4 Emission Bandwidth-FCC Part 24.238(b)

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

Test Setup:



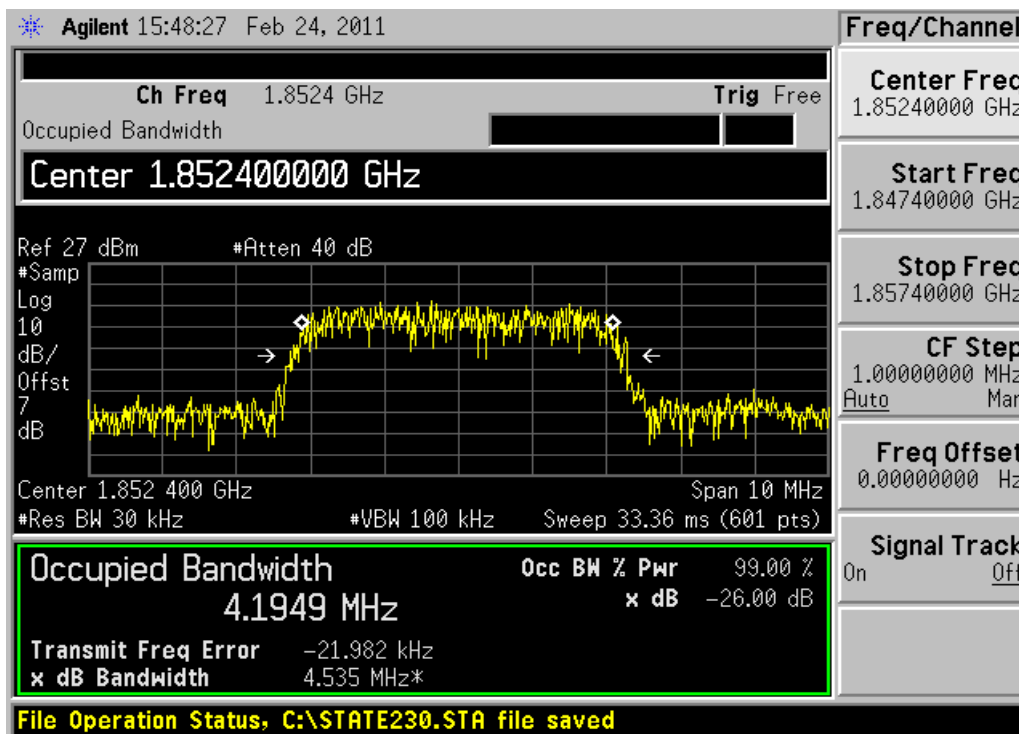
Test procedure:

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 emission bandwidth is measured using spectrum analyzer. RBW is set to 30kHz on spectrum analyzer. The bandwidth of -26dBc power can be read on spectrum analyzer. The measurement will be conducted at three channels No9262, No9400 and No9538 (Bottom, middle and top channels of WCDMA band II)

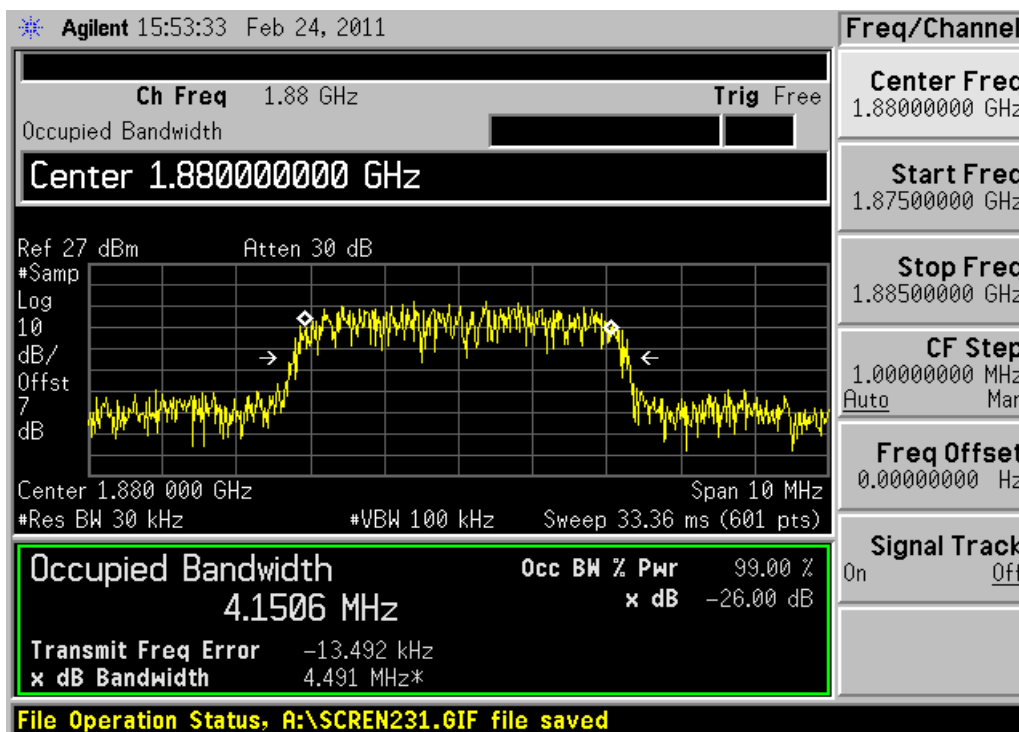
Limits: No specific occupied bandwidth requirements in part 24.238

Test result:

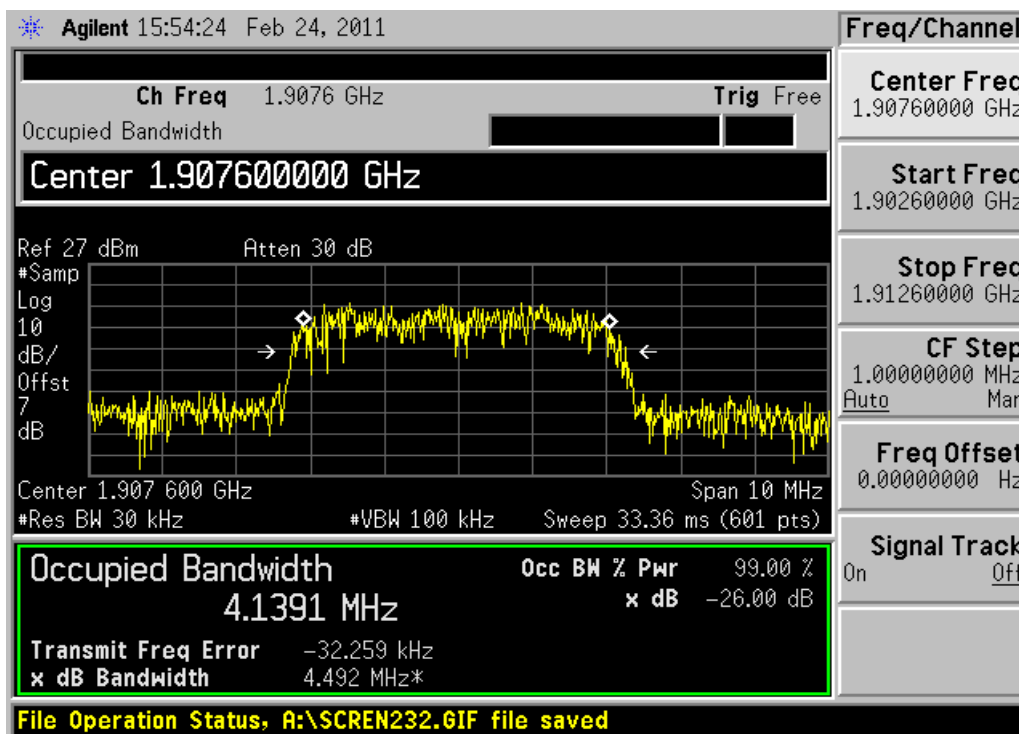
Carrier frequency (MHz)	Channel No.	Bandwidth of -26dBc Power (MHz)
1852.4	9262	4.535
1880.0	9400	4.491
1907.6	9538	4.492



Channel 9262



Channel 9400



Channel 9538

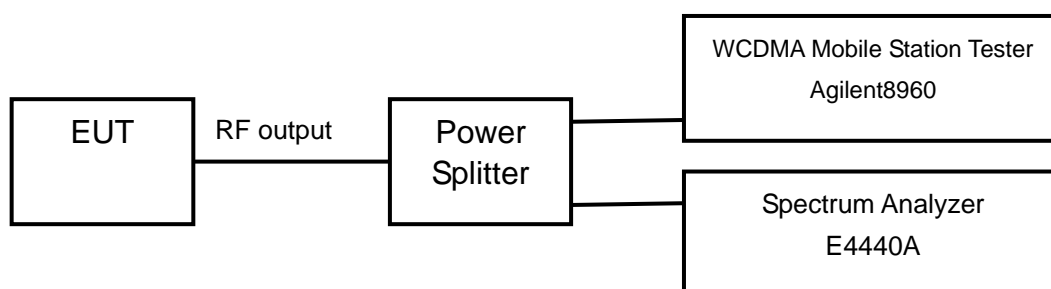


### 2.2.1.5 Conducted Spurious Emissions-FCC Part 2.1057/Part 24.238

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

Test Setup:



Test procedure:

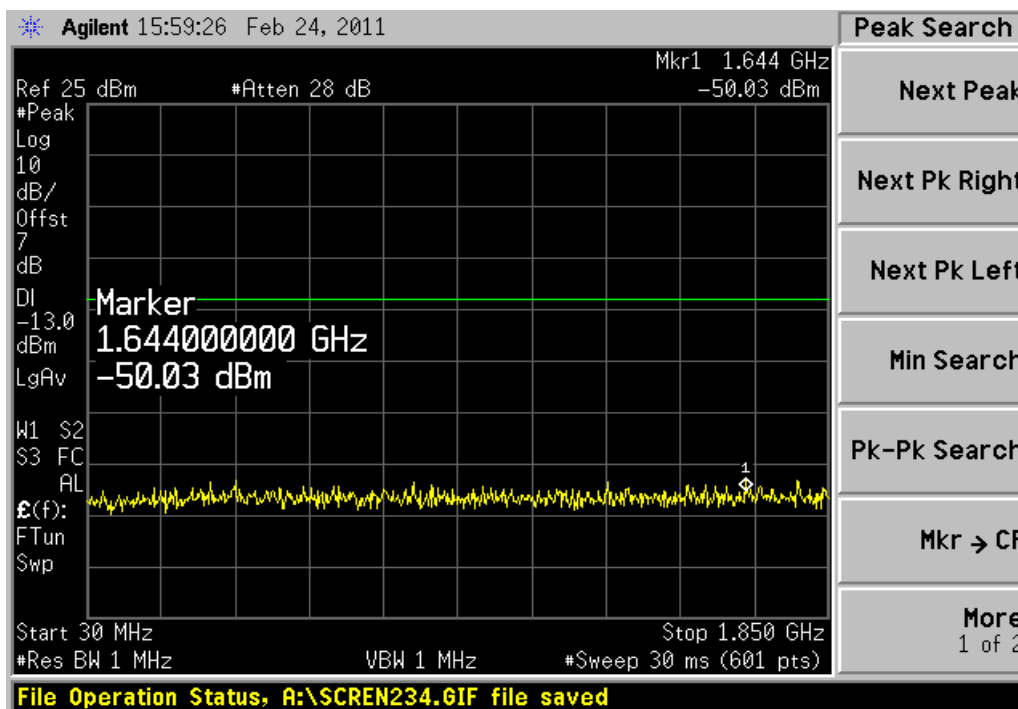
After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to 20GHz (higher than the 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 No 9400 (middle channel of WCDMA band II)

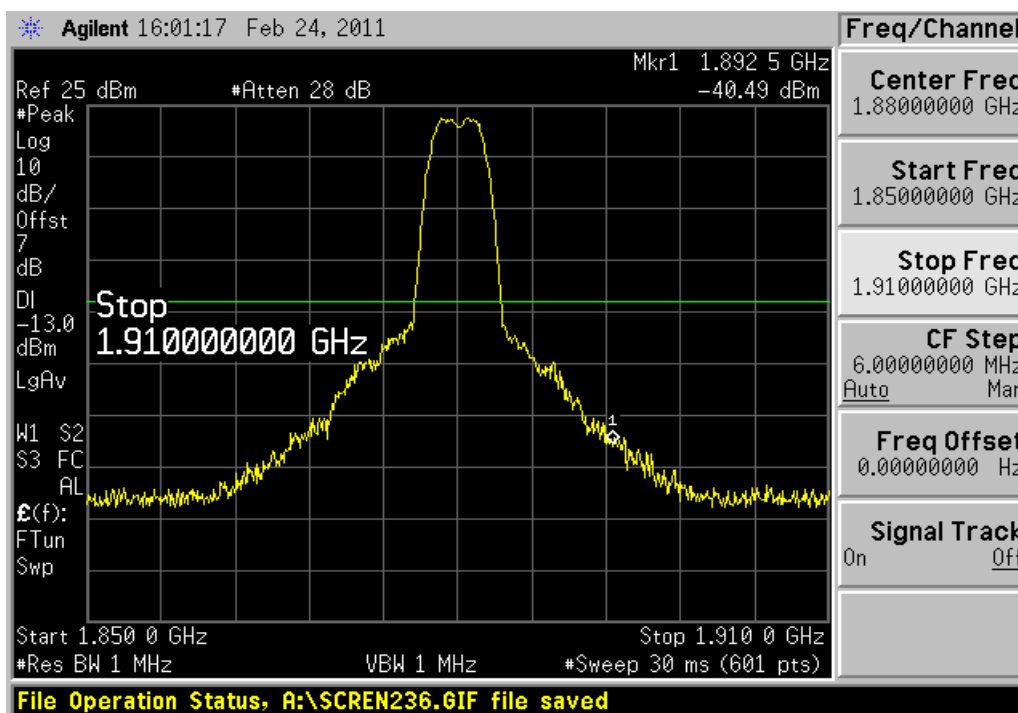
Limits	≤ -13dBm
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Test result:

Refer to the following figures.

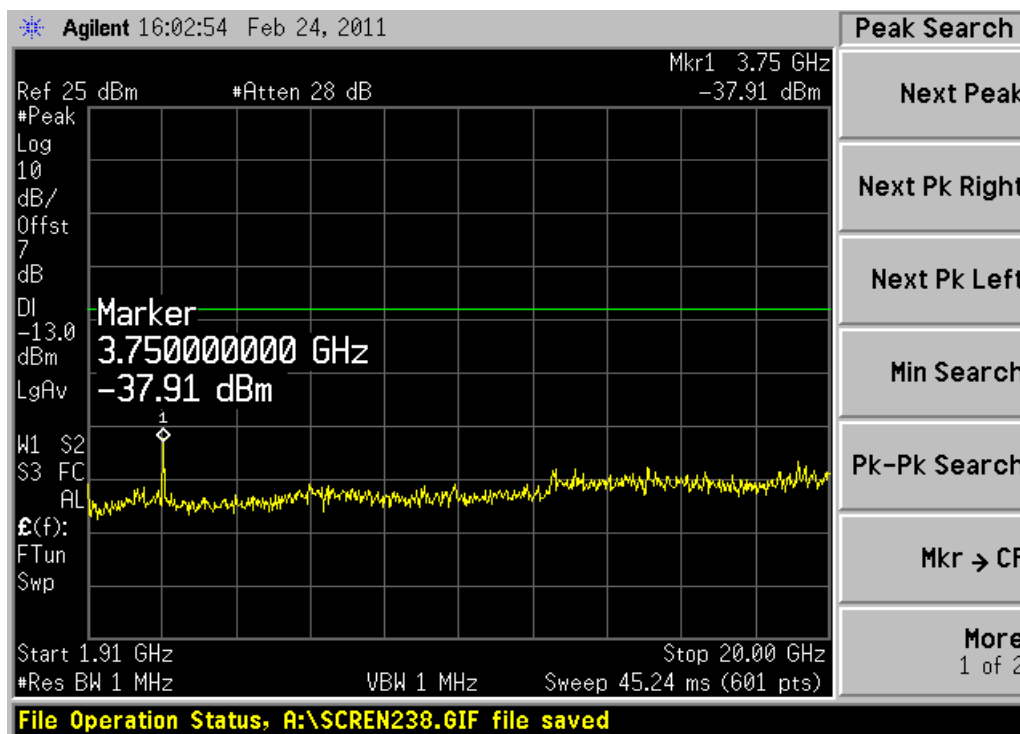


Channel 9400, 30MHz~1850MHz



Channel 9400, 1850MHz~1910MHz

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



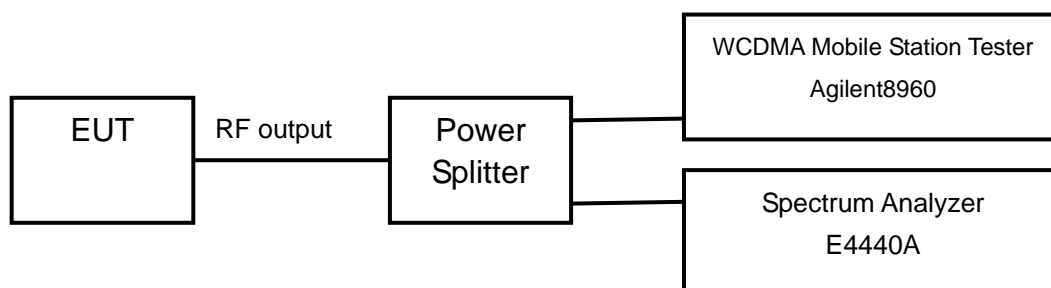
Channel 9400, 1910MHz~20GHz

### 2.2.1.6 Band Edges Compliance-FCC Part 24.238(b)

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

Test Setup:



Test procedure:

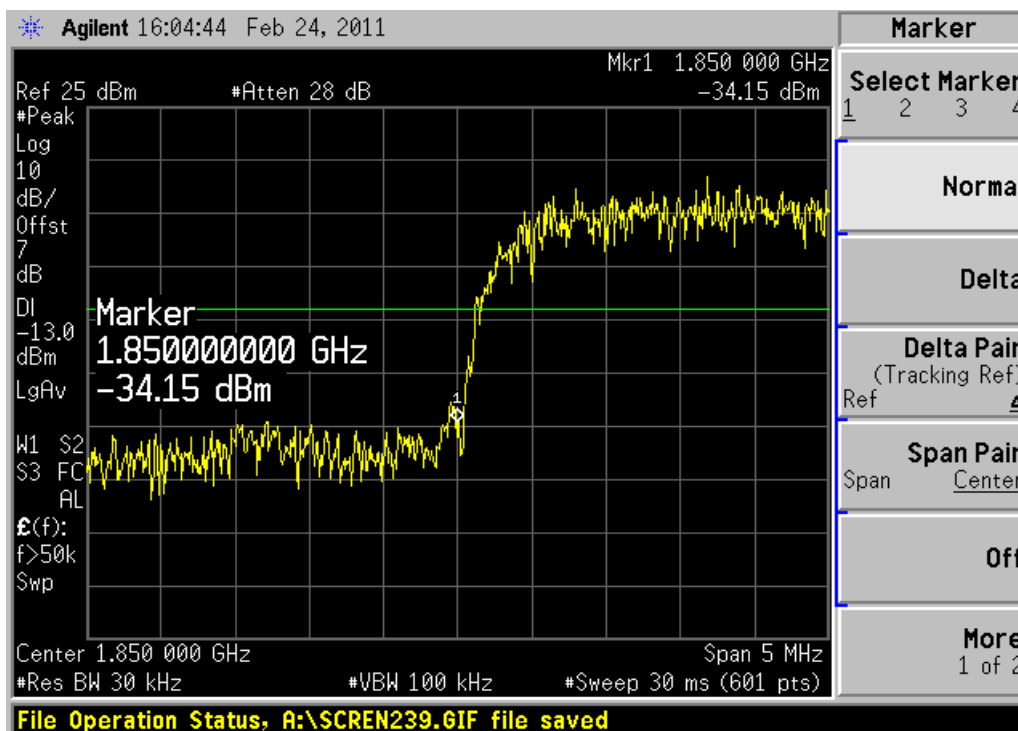
After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The peak detector is used and RBW is set to 30KHz on spectrum analyzer.

The measurement will be conducted at two channels No9262 and No9538 (Bottom and top channels of WCDMA band II)

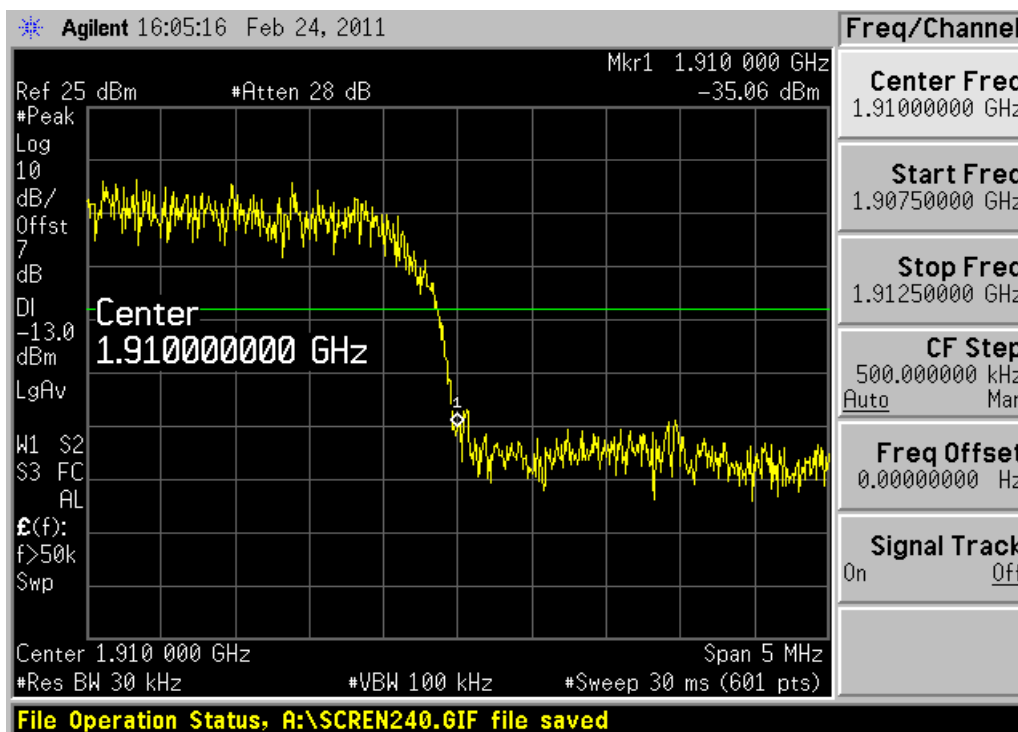
Limits	$\leq -13\text{dBm}$
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Test result:

Refer to the following figures.



Channel 9262



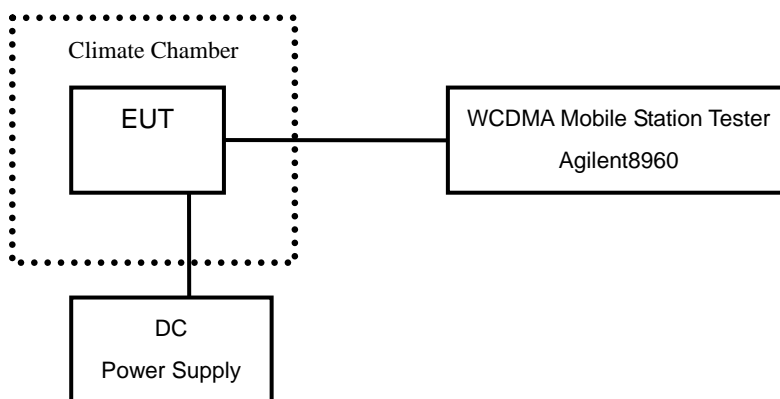
Channel 9538

### 2.2.1.7 Frequency Stability-FCC Part 2.1055

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 3.5 to 4.2 V. The measurement will be conducted at three channels No9262, No9400 and No9538 (Bottom, middle and top channels of WCDMA band II).

Limits: No specific frequency stability requirements in part 2.1055.

Test result:

Temperature(°C)	Test Result (ppm)@3.8V		
	Channel 9262	Channel 9400	Channel 9538
-30	0.001	0.002	0.002
-20	0.002	0.001	0.002
-10	0.002	0.002	0.002
0	0.001	0.002	0.001
+10	0.001	0.002	0.000
+20	0.001	0.001	0.001
+30	0.002	0.002	0.001
+40	0.001	0.001	0.001
+50	0.002	0.001	0.002

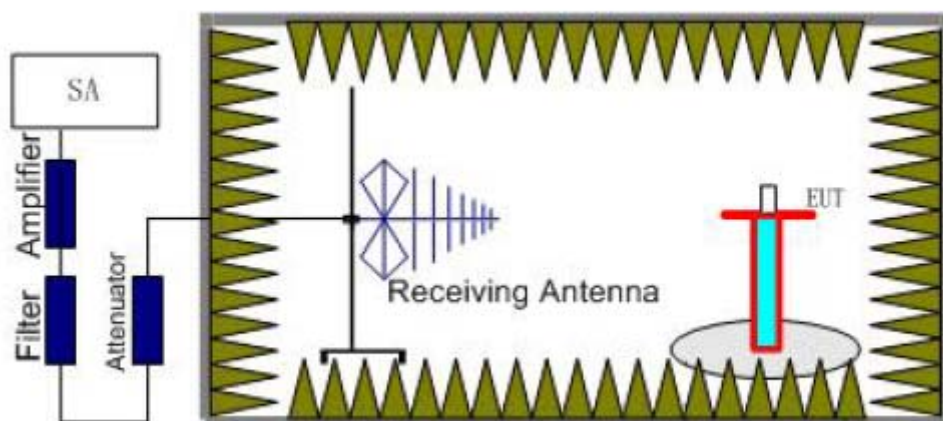
Voltage (V)	Test Result (ppm)@20°C		
	Channel 9262	Channel 9400	Channel 9538
3.5	0.002	0.001	0.001
4.2	0.002	0.001	0.002

### 2.2.1.8 Radiated Spurious Emissions-FCC Part 2.1053/Part 24.238

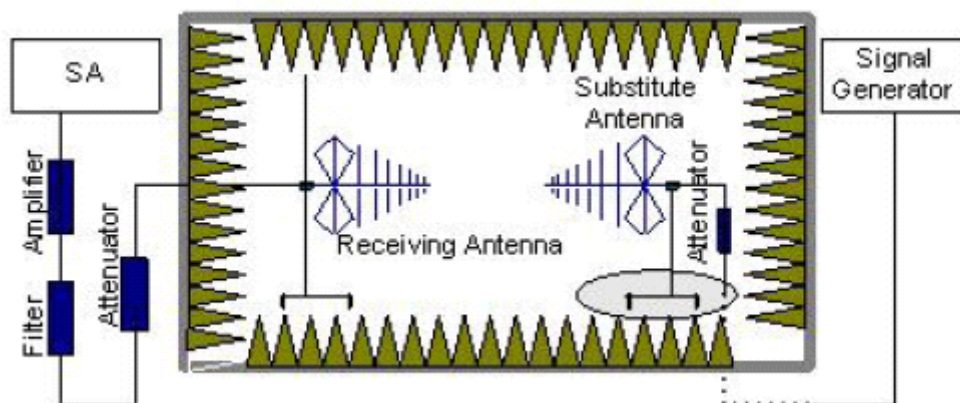
Ambient condition

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

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 10<sup>th</sup> 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<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.

A power ( $P_{mea}$ ) 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 ( $P_r$ ). The power of signal source ( $P_{mea}$ ) 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 ( $P_{ca}$ ) and the Substitution Antenna Gain ( $G_a$ ).

#### 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:

$$\text{Power(EIRP)} = P_{mea} + P_{ca} + G_a$$

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,  $ERP = EIRP - 2.15 \text{ (dB)}$ .

Assumed the power of signal source record is -20dBm. A cable loss of -30dB, and an antenna gain of 11dB are added.

$$P = P_{\text{mea}} + P_{\text{ca}} + G_a = (-20\text{dBm}) + (-30\text{dB}) + (11\text{dB}) = -39\text{dBm}$$

The measurement will be done at carrier frequencies that pertain to bottom (Channel 9262), middle (Channel 9400) and top (Channel 9538) channels of WCDMA band II.

Test result:

WCDMA band II MODE Channel 9262:

Frequency (MHz)	Power (dBm)	Pca Cable loss (dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
2466.93	-43.1	-5.6	8.6	-46.1	-13	Vertical
2774.05	-41.0	-5.8	8.9	-44.1	-13	Horizontal
3705.91	-43.8	-6.9	9.1	-46.0	-13	Vertical
6654.99	-41.9	-8.9	11.2	-44.2	-13	Vertical
9992.58	-38.9	-13.7	13.8	-39.0	-13	Vertical
17871.05	-32.2	-15.9	12.4	-28.7	-13	Horizontal

WCDMA band II MODE Channel 9400:

Frequency (MHz)	Power (dBm)	Pca Cable loss (dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
2481.5	-43.4	-5.6	8.6	-40.4	-13	Vertical
2791.3	-40.6	-5.8	8.9	-43.7	-13	Vertical
3761.8	-43.5	-6.9	9.1	-45.7	-13	Vertical
6654.3	-41.7	-8.9	11.2	-44.0	-13	Horizontal
10000.0	-39.2	-13.7	13.8	-39.3	-13	Vertical
17852.9	-32.3	-15.9	12.4	-28.8	-13	Vertical

WCDMA band II MODE Channel 9262:

Frequency (MHz)	Power (dBm)	Pca Cable loss (dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
2492.74	-43.1	-5.6	8.6	-46.1	-13	Vertical
2777.00	-41.0	-5.8	8.9	-44.1	-13	Horizontal
3810.69	-43.5	-6.9	9.1	-45.7	-13	Vertical
6664.28	-42.0	-8.9	11.2	-44.3	-13	Horizontal
9992.87	-39.0	-13.7	13.8	-39.1	-13	Horizontal
17865.88	-32.2	-15.9	12.4	-28.7	-13	Vertical

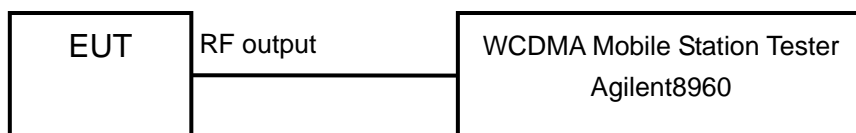
## 2.2.2 WCDMA Band V

### 2.2.2.1 RF Power Output-FCC Part 22.913(a)

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 No4132, No4183 and No4233 (Bottom, middle and top channels of WCDMA band V)

Limits	≤24dBm
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Test result:

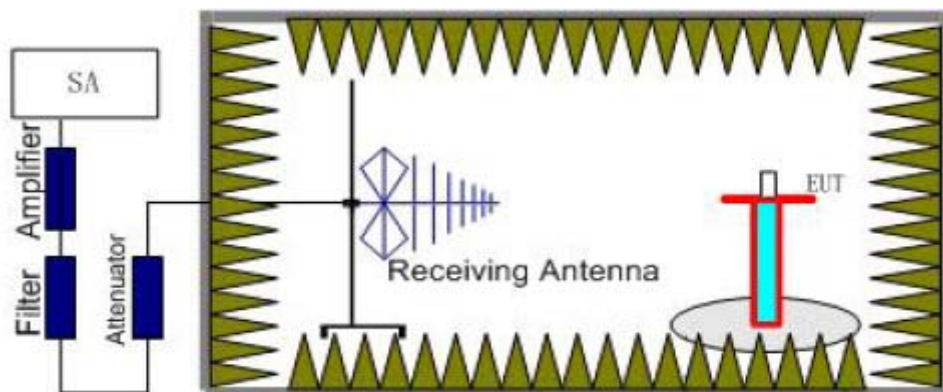
Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
826.4	4132	22.9
836.6	4183	22.8
846.6	4233	22.9

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

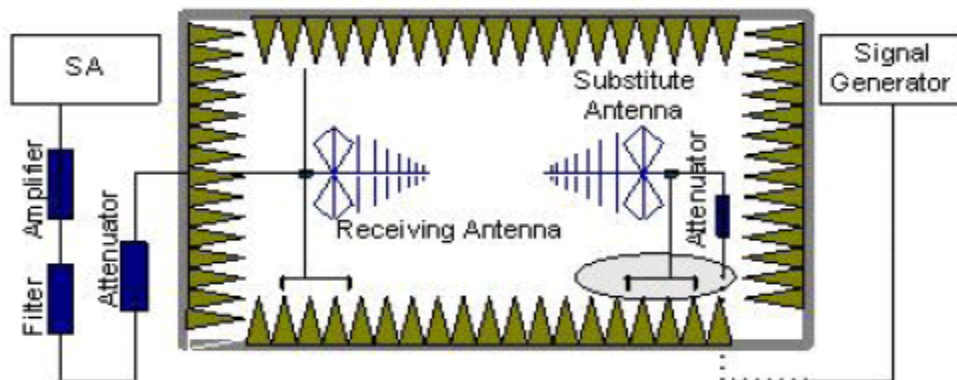
Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

Test setup:



Step 1



Step 2

Test procedure:

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

Step 1:

The measurement is carried out in the fully anechoic chamber. EUT was placed on a 2.4 meters high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. The height of receiving antenna is 2.4m and varies in certain range to find the maximum power value. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used and

RBW is set to 3MHz. Then the antenna height and turn table rotation is adjusted till the maximum power value is founded on spectrum analyzer or receiver. And the maximum value of the receiver should be recorded as (Pr).

Step 2:

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

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

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

The measurement results are obtained as described below:

$$\text{Power (EIRP)} = P_{\text{mea}} + P_{\text{ca}} + G_{\text{a}}$$

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,  $\text{ERP} = \text{EIRP} - 2.15 \text{ (dB)}$ .

The measurement will be done at three channels No4132, No4183 and No4233 (Bottom, middle and top channels of WCDMA band V)

Limits	$\leq 38.5\text{dBm}$
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Test result:

Frequency (MHz)	Peak ERP (dBm)	Pca Cable loss (dB)	Ga Antenna Gain (dB)	Correction (dB)	Pmea (dBm)	Polarization
826.4	23.5	-3.8	8.6	2.15	20.85	Vertical
836.6	23.8	-3.8	8.6	2.15	21.15	Vertical
846.6	23.3	-3.8	8.6	2.15	20.65	Horizontal

Frequency: 836.6MHz

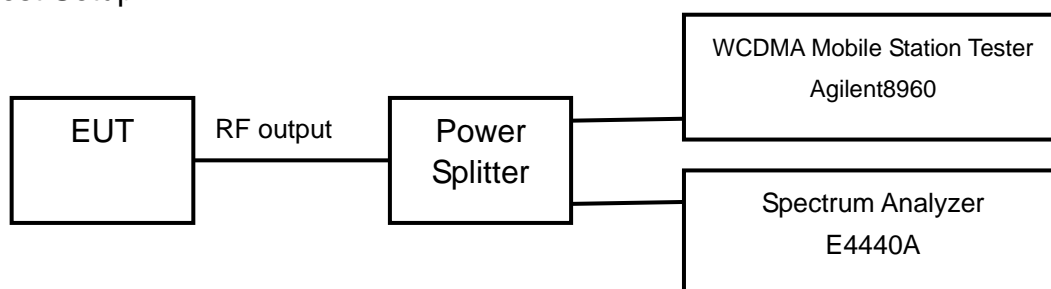
$$\text{Peak ERP (dBm)} = P_{\text{mea}} (21.15\text{dBm}) + P_{\text{ca}} (-3.8\text{dB}) + G_{\text{a}} (8.6\text{dB}) - 2.15\text{dB} = 23.8\text{dBm}$$

### 2.2.2.3 Occupied Bandwidth-FCC Part 2.1049(h)(i)

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

Test Setup:



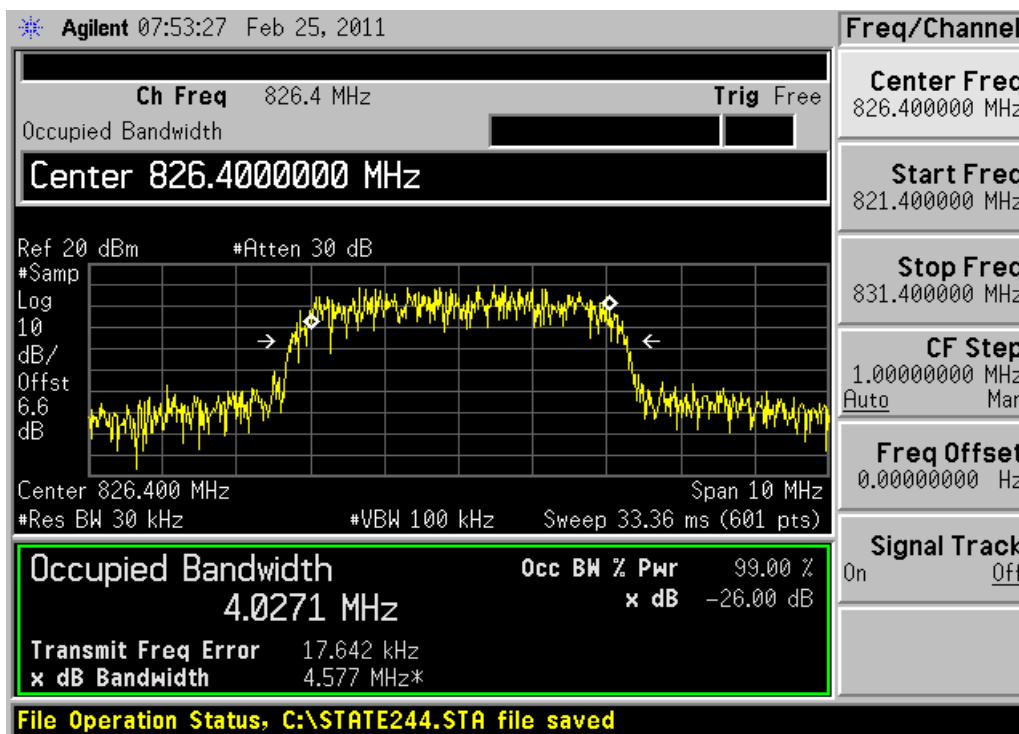
Test procedure:

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 30kHz on spectrum analyzer. The bandwidth of 99% power can be read on spectrum analyzer. The measurement will be conducted at three channels No4132, No4183 and No4233 (Bottom, middle and top channels of WCDMA band V)

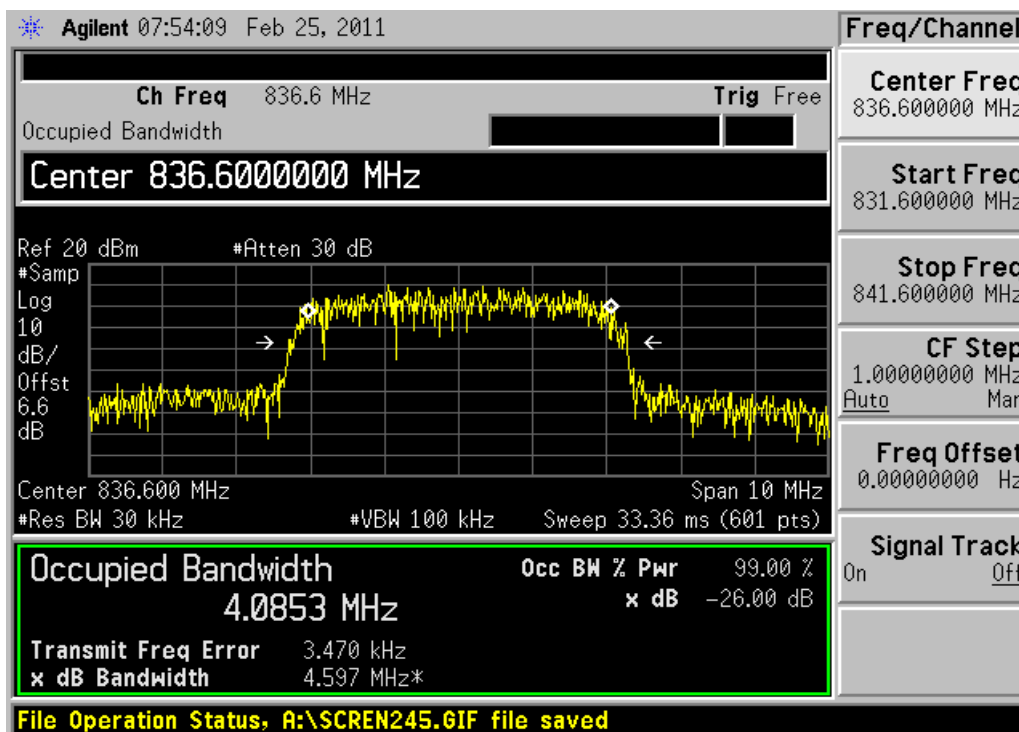
Limits: No specific occupied bandwidth requirements in part 2.1049

Test result:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (MHz)
826.4	4132	4.0271
836.6	4183	4.0853
846.6	4233	4.0456

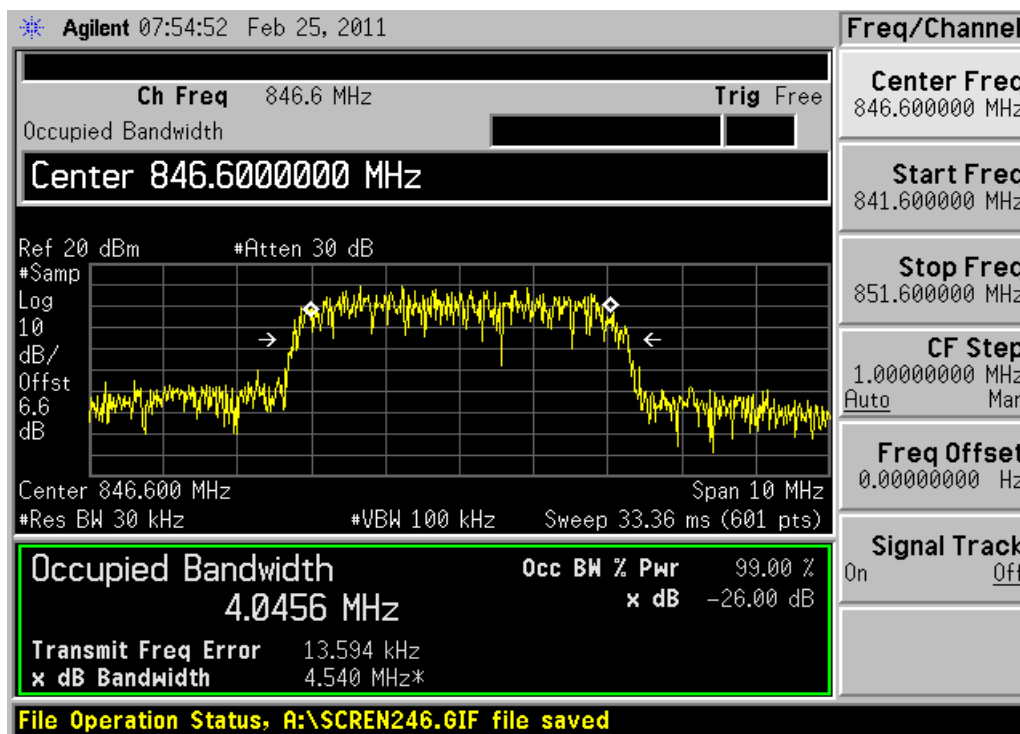


Channel 4132



Channel 4183





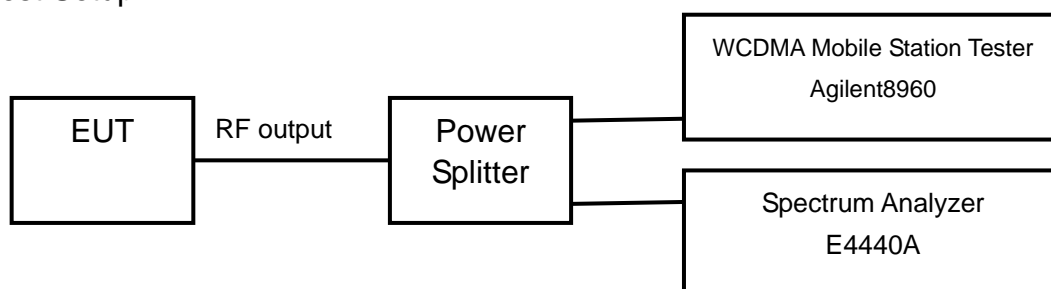
Channel 4233

### 2.2.2.4 Emission Bandwidth-FCC Part 22.917(b)

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

Test Setup:



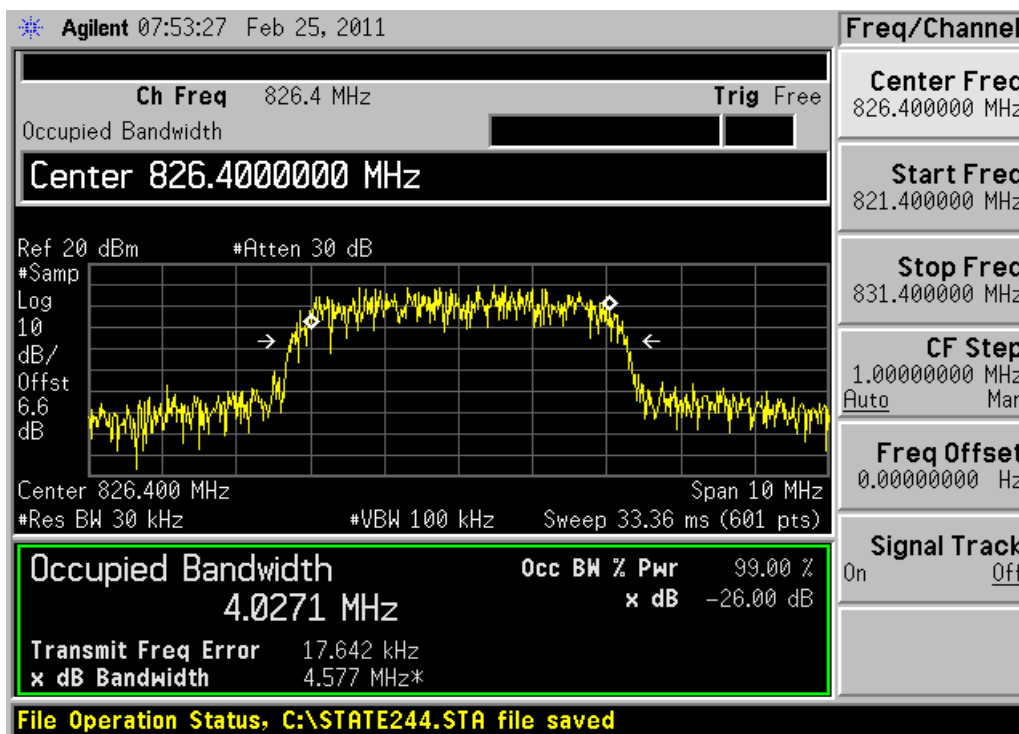
Test procedure:

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 30kHz on spectrum analyzer. The bandwidth of -26dBc power can be read on spectrum analyzer. The measurement will be conducted at three channels No9262, No9400 and No9538 (Bottom, middle and top channels of WCDMA band V)

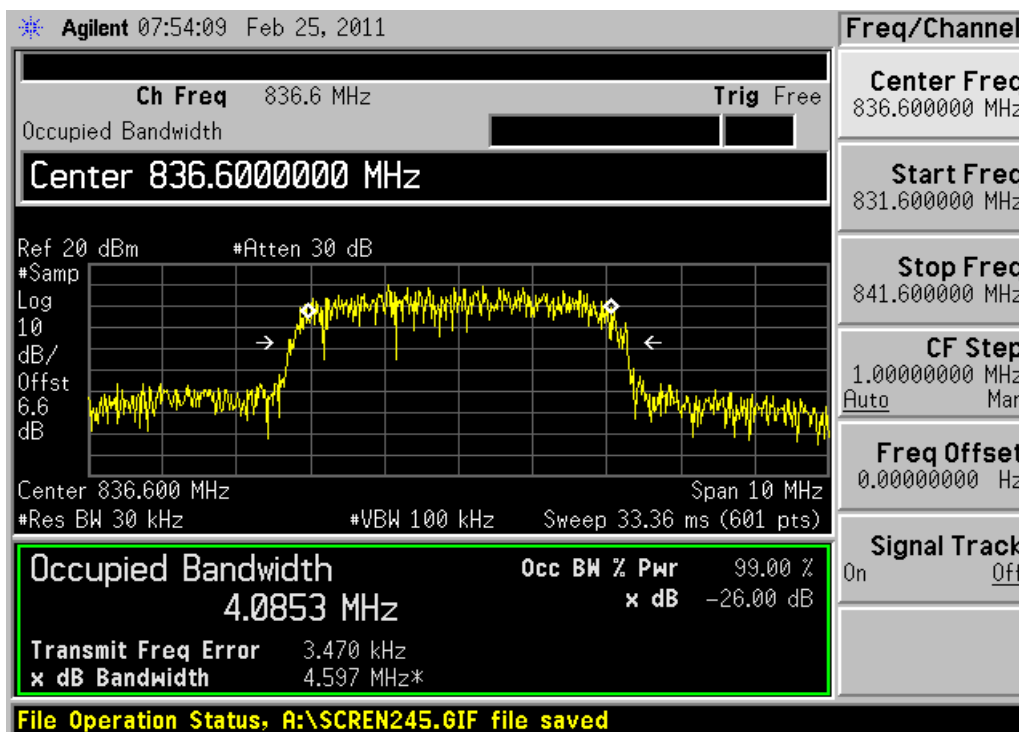
Limits: No specific occupied bandwidth requirements in part 22.917

Test result:

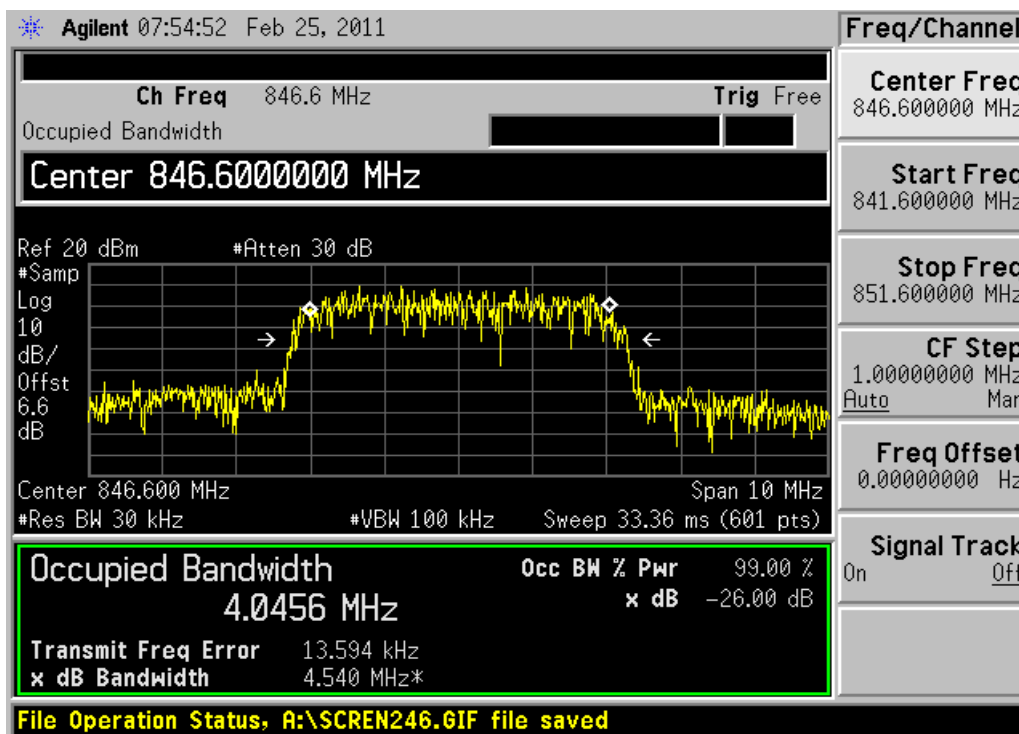
Carrier frequency (MHz)	Channel No.	Bandwidth of -26dBc Power (MHz)
826.4	4132	4.577
836.6	4183	4.597
846.6	4233	4.540



Channel 4132



Channel 4183



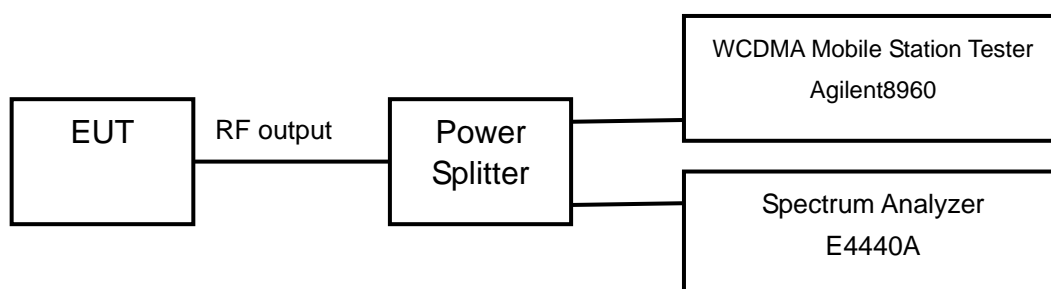
Channel 4233

### 2.2.2.5 Conducted Spurious Emissions-FCC Part 2.1057/Part 22.917

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

Test Setup:



Test procedure:

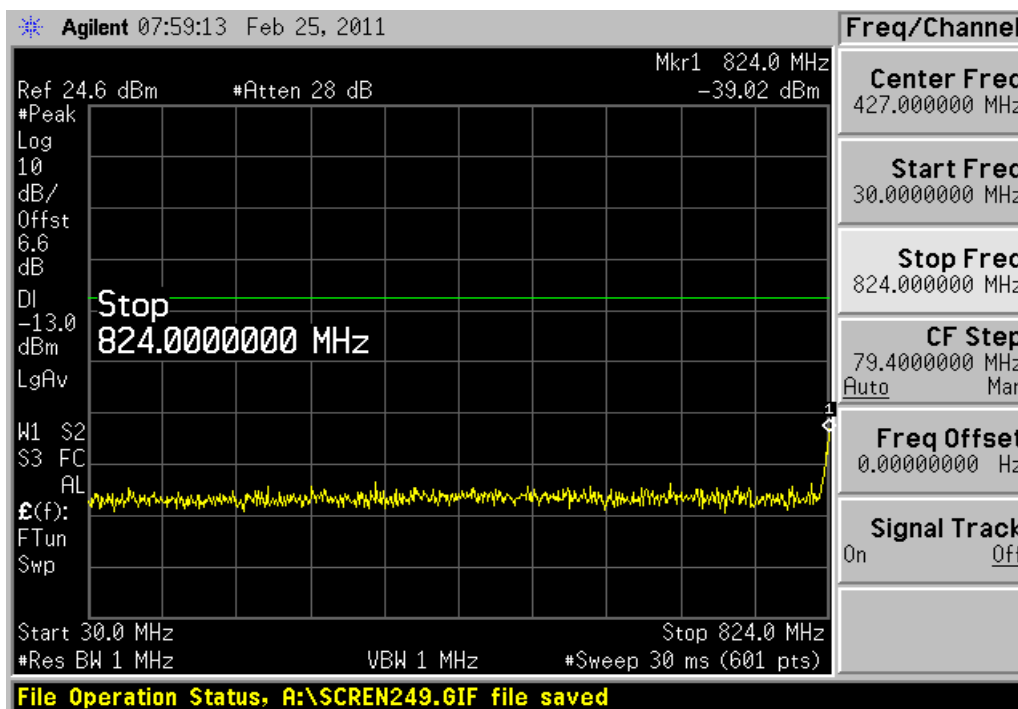
After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to 9GHz (higher than the 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 No 4183 (middle channel of WCDMA band V)

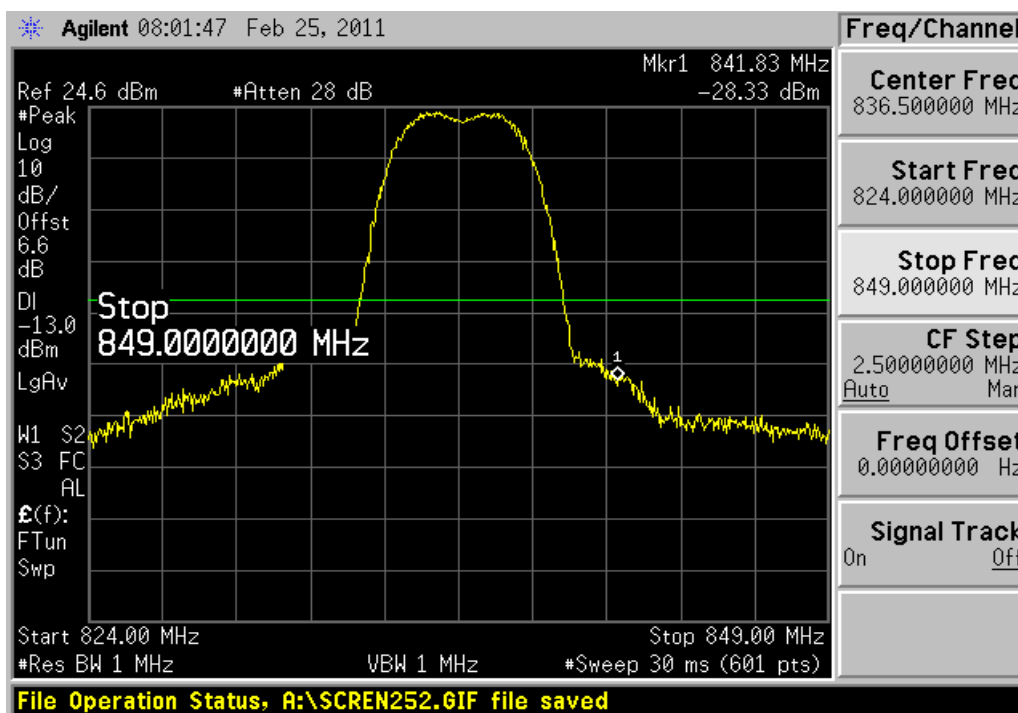
Limits	≤ -13dBm
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Test result:

Refer to the following figures.

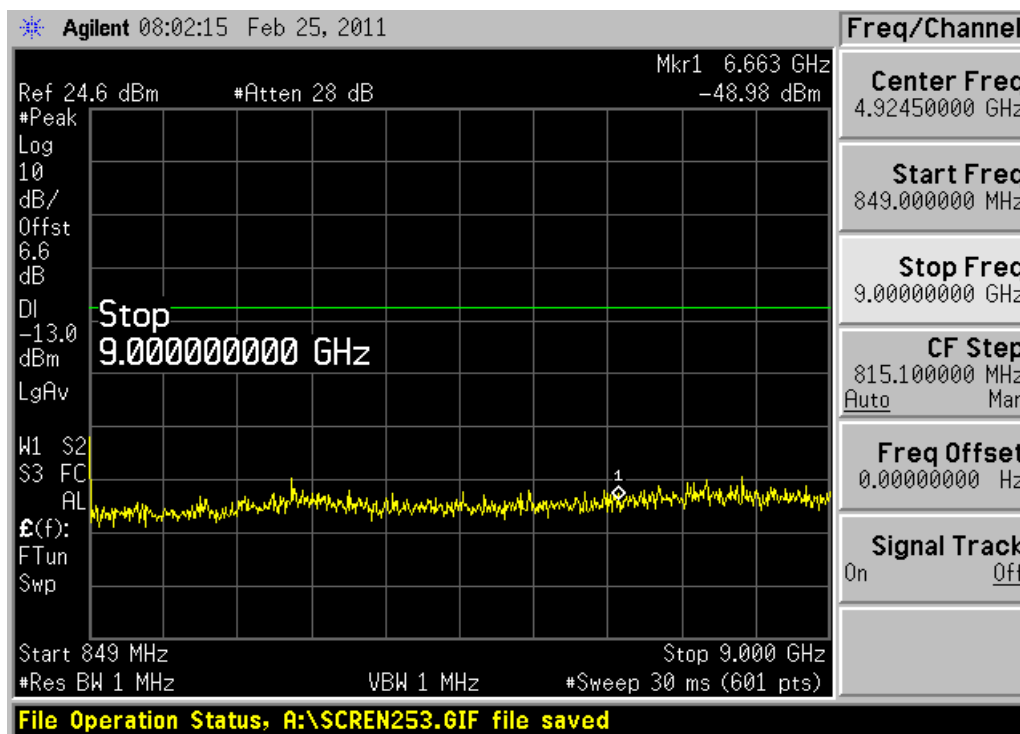


Channel 4183, 30MHz~824MHz



Channel 4183, 824MHz~849MHz

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



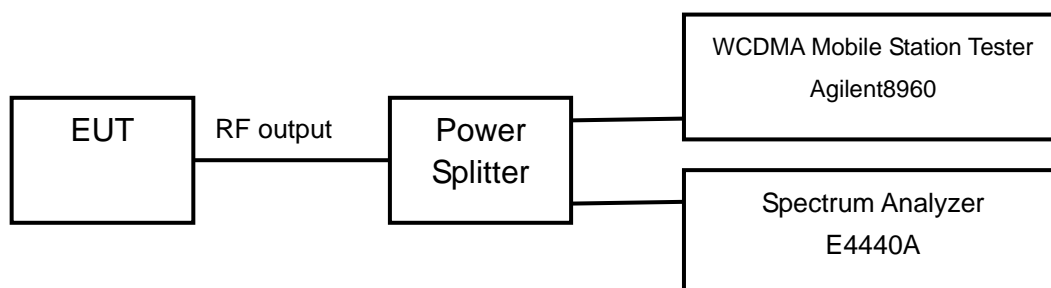
Channel 4183, 849MHz~9GHz

### 2.2.2.6 Band Edges Compliance-FCC Part 22.917(b)

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 30KHz on spectrum analyzer.

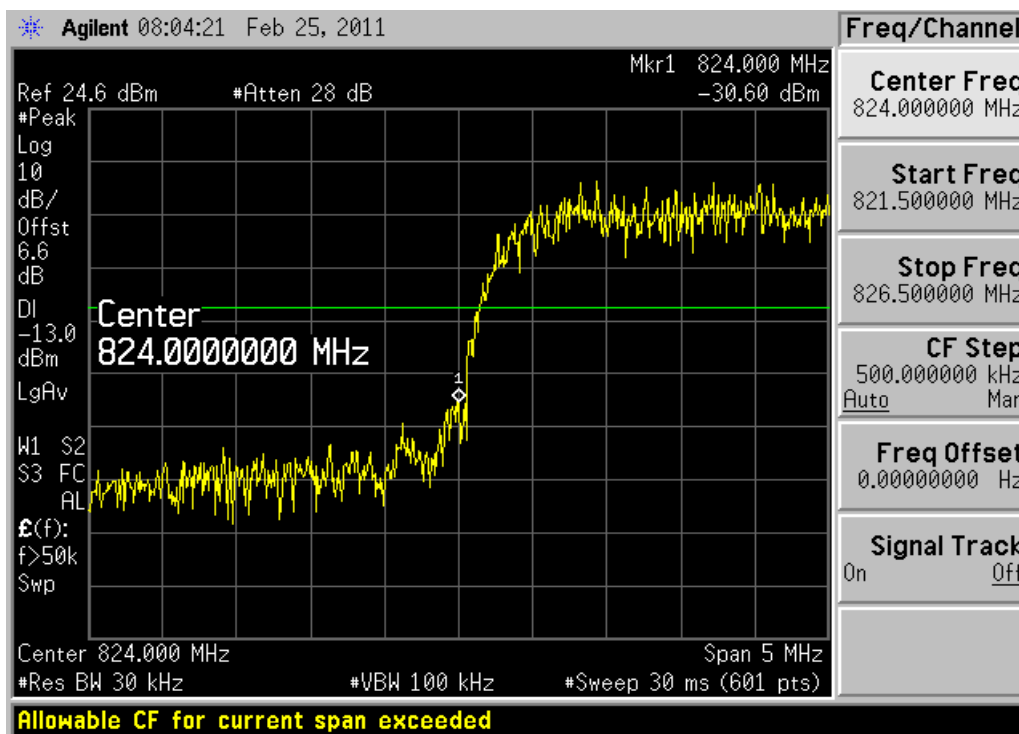
The measurement will be conducted at two channels No4132 and No4233 (Bottom and top channels of WCDMA band V)

Limits	≤ -13dBm
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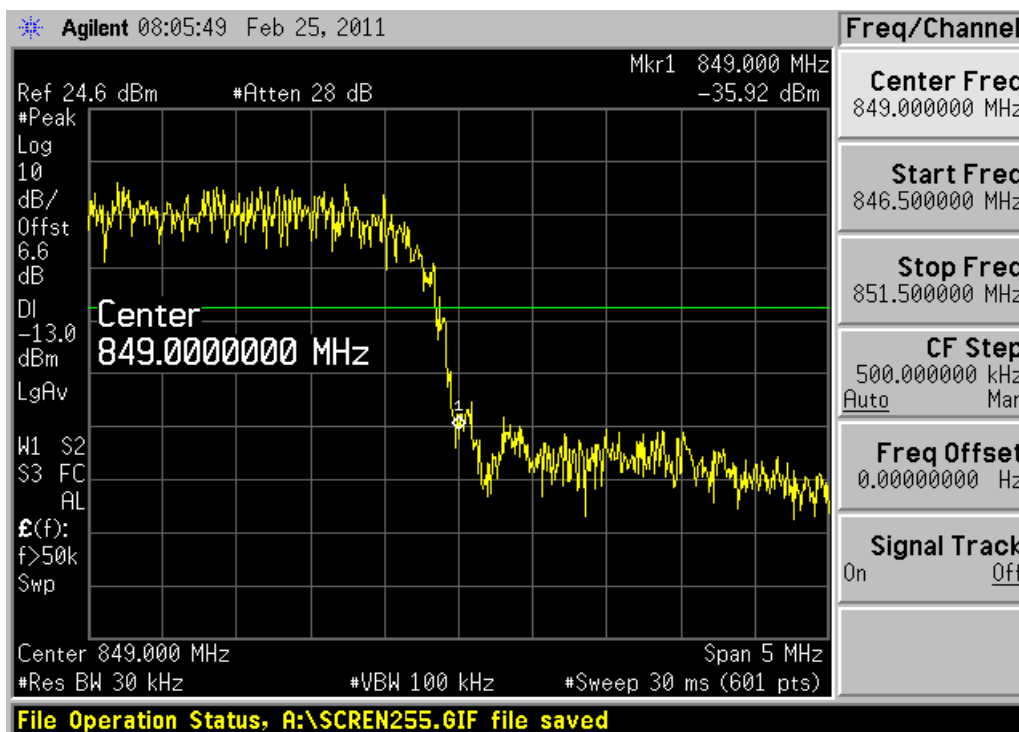
Test result:

Refer to the following figures.





Channel 4132



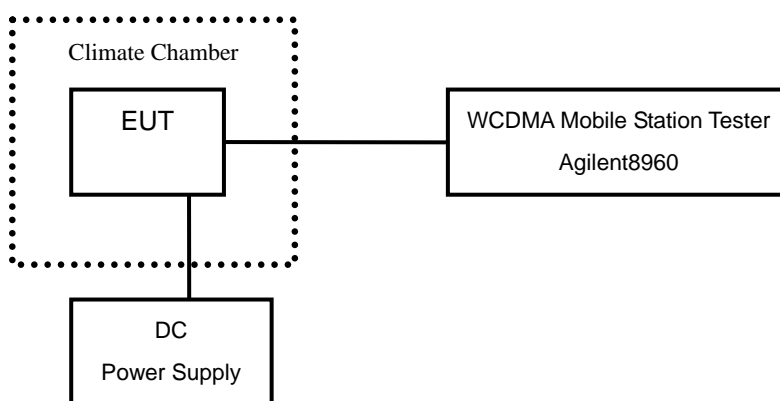
Channel 4233

### 2.2.2.7 Frequency Stability-FCC Part 2.1055

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 3.5 to 4.2 V. The measurement will be conducted at three channels No4132, No4183 and No4233 (Bottom, middle and top channels of WCDMA band V).

Limits: No specific frequency stability requirements in part 2.1055.

Test result:

Temperature(°C)	Test Result (ppm)@3.8V		
	Channel 4132	Channel 4183	Channel 4233
-30	0.004	0.004	0.003
-20	0.005	0.004	0.004
-10	0.003	0.003	0.003
0	0.002	0.002	0.002
+10	0.002	0.002	0.002
+20	0.000	0.001	0.001
+30	0.002	0.001	0.002
+40	0.003	0.002	0.002
+50	0.002	0.002	0.002

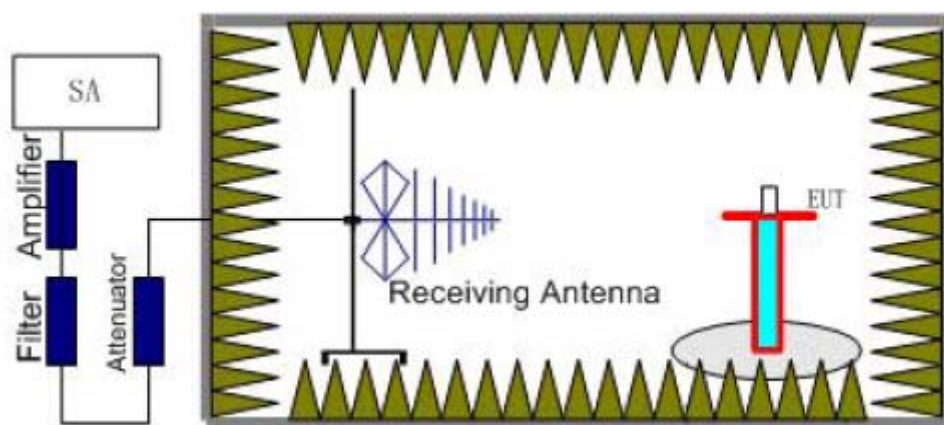
Voltage (V)	Test Result (ppm)@20°C		
	Channel 4132	Channel 4183	Channel 4233
3.5	0.002	0.003	0.002
4.2	0.002	0.002	0.002

## 2.2.2.8 Radiated Spurious Emissions-FCC Part 2.1053/Part 22.917

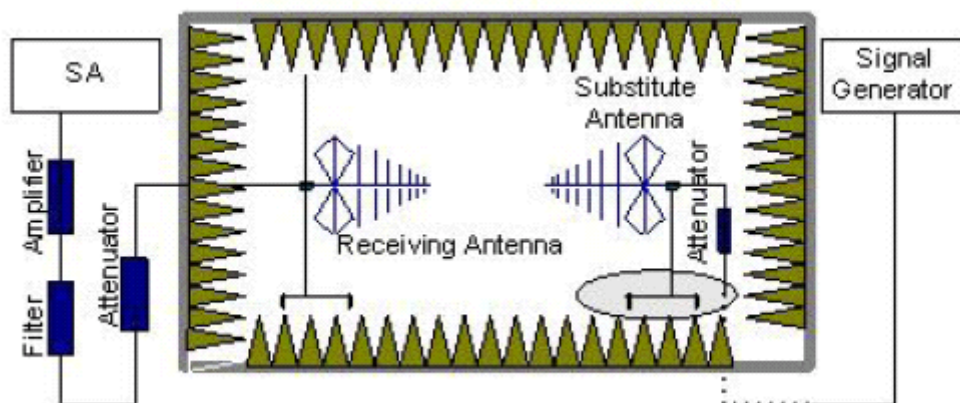
Ambient condition

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

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 10<sup>th</sup> 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<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.

A power ( $P_{mea}$ ) 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 ( $P_r$ ). The power of signal source ( $P_{mea}$ ) 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 ( $P_{ca}$ ) and the Substitution Antenna Gain ( $G_a$ ).

#### 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:

$$\text{Power(EIRP)} = P_{mea} + P_{ca} + G_a$$

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,  $ERP = EIRP - 2.15 \text{ (dB)}$ .

Assumed the power of signal source record is -20dBm. A cable loss of -30dB, and an antenna gain of 11dB are added.

$$P=P_{\text{mea}}+P_{\text{ca}}+G_{\text{a}}=(-20\text{dBm})+(-30\text{dB})+(11\text{dB})=-39\text{dBm}$$

The measurement will be done at carrier frequencies that pertain to bottom (Channel 4132), middle (Channel 4183) and top (Channel 4233) channels of WCDMA band V.

Test result:

WCDMA band V MODE Channel 4132:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
1653.35	-52.0	-4.6	8.3	-55.7	-13	Vertical
1688.44	-52.3	-4.8	8.3	-55.8	-13	Horizontal
2477.32	-44.5	-5.7	8.6	-47.4	-13	Vertical
2480.91	-44.9	-5.9	8.9	-47.9	-13	Vertical
8959.09	-45.2	-10.8	12.7	-47.1	-13	Horizontal
9932.85	-36.3	-11.8	13.8	-38.3	-13	Vertical

WCDMA band V MODE Channel 4183:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
1673.21	-51.72	-4.6	8.3	-55.42	-13	Vertical
1674.36	-52.68	-4.8	8.3	-56.18	-13	Vertical
2509.86	-44.63	-5.7	8.60	-47.53	-13	Vertical
2510.73	-45.18	-5.9	8.90	-48.18	-13	Vertical
8977.6	-45.39	-10.8	12.70	-47.29	-13	Vertical
9923.8	-36.54	-11.8	13.80	-38.54	-13	Horizontal

WCDMA band V MODE Channel 4233:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
1693.66	-52.8	-4.6	8.3	-56.5	-13	Vertical
1801.50	-47.8	-4.9	8.3	-51.2	-13	Horizontal
2502.40	-45.4	-5.7	8.6	-48.3	-13	Vertical
2540.20	-45.8	-5.9	8.9	-48.8	-13	Vertical
8996.33	-46.0	-10.8	12.7	-47.9	-13	Vertical
9950.54	-36.7	-11.8	13.8	-38.7	-13	Vertical

### 2.3. List of test equipments

No.	Name/Model	Manufacturer	S/N	Calibration Due Date
1	E5515C(8960) Mobile Station Tester	Agilent	GB44050904	19 <sup>th</sup> Aug. 2011
2	PSA E4440A Spectrum Analyzer	Agilent	MY41000183	19 <sup>th</sup> Aug. 2011
3	66309B DC Power Supply	Agilent	MY43000461	19 <sup>th</sup> Aug. 2011
4	1506A Power Splitter	Weinschel	MN154	19 <sup>th</sup> Aug. 2011
5	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	19 <sup>th</sup> Aug. 2011
6	ESI 40 EMI test receiver	R&S	100015	19 <sup>th</sup> Aug. 2011
7	SMR 20 Signal generator	R&S	100086	19 <sup>th</sup> Aug. 2011
8	CMU 200 Radio tester	R&S	100313	19 <sup>th</sup> Aug. 2011
9	12.65m*8.03m*7.50m Fully-Anechoic Chamber	FRANKONIA	-----	19 <sup>th</sup> Aug. 2011
10	HL562 Ultra log test antenna	R&S	100016	19 <sup>th</sup> Aug. 2011
11	23.18m×16.88m×9.60m Semi-Anechoic Chamber	FRANKONIA	-----	19 <sup>th</sup> Aug. 2011
12	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100030	19 <sup>th</sup> Aug. 2011
13	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100029	19 <sup>th</sup> Aug. 2011
14	PS2000 Turn Table	FRANKONIA	-----	19 <sup>th</sup> Aug. 2011
15	MA260 Antenna Master	FRANKONIA	-----	19 <sup>th</sup> Aug. 2011
16	SH-241 Climatic Chamber	ESPEC	92000389	19 <sup>th</sup> Aug. 2011
17	ES-K1 EMI test software	R&S	-----	19 <sup>th</sup> Aug. 2011
18	HL562 Receive antenna	R&S	100167	19 <sup>th</sup> Aug. 2011



## Appendix

### Appendix1 Test Setup