



# TEST REPORT

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Report No.: SRMC2010-H024-E0041

Product Name: GSM/GPRS/EDGE/

WCDMA/HSDPA/HSUPA Module

Product Model: MF210V

Applicant: ZTE Corporation

Manufacture: ZTE Corporation

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

(October 1, 2008 edition)

FCC ID: Q78-ZTEMF210V

The State Radio Monitoring Center

State Radio Spectrum Monitoring and Testing Center

No.80 Beilishi Road Xicheng District Beijing, China

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## CONTENTS

1. General information .....	3
1.1 Notes of the test report .....	3
1.2 Information about the testing laboratory .....	3
1.3 Applicant's details .....	3
1.4 Manufacturer's details .....	3
1.5 Application details .....	4
1.6 Reference specification .....	4
1.7 Information of EUT .....	4
1.7.1 General information .....	4
1.7.2 EUT details .....	5
1.7.3 Auxiliary equipment details .....	5
2. Test information .....	6
2.1 Summary of the test results .....	6
2.2 Test result .....	7
2.2.1 WCDMA Band II .....	7
2.2.1.1 RF Power Output-FCC Part 22.913(a)/Part 24.232(b) .....	7
2.2.1.2 Effective Radiated Power-FCC Part 22.913(a)/Part 24.232(b) .....	8
2.2.1.3 Occupied Bandwidth-FCC Part 2.1049(h)(i) .....	10
2.2.1.4 Emission Bandwidth-FCC Part 22.917(b)/Part 24.238(b) .....	13
2.2.1.5 Conducted Spurious Emissions-FCC Part 2.1057/22.917/24.238 .....	16
2.2.1.6 Band Edges Compliance-FCC Part 22.917(b)/ Part 24.238(b) .....	19
2.2.1.7 Frequency Stability-FCC Part 2.1055/Part 24.235 .....	21
2.2.1.8 Radiated Spurious Emissions-FCC Part 2.1053/Part 22.917(a) .....	23
2.2.2 Test result .....	26
2.2.2.1 WCDMA Band V .....	26
2.2.2.1.1 RF Power Output-FCC Part 22.913(a)/Part 24.232(b) .....	26
2.2.2.1.2 Effective Radiated Power-FCC Part 22.913(a)/Part 24.232(b) .....	27
2.2.2.1.3 Occupied Bandwidth-FCC Part 2.1049(h)(i) .....	29
2.2.2.1.4 Emission Bandwidth-FCC Part 22.917(b)/ Part 24.238(b) .....	32
2.2.2.1.5 Conducted Spurious Emissions-FCC Part 2.1057/22.917/24.238 .....	35
2.2.2.1.6 Band Edges Compliance-FCC Part 22.917(b)/Part 24.238(b) .....	38
2.2.2.1.7 Frequency Stability-FCC Part 2.1055/Part 24.235 .....	40
2.2.2.1.8 Radiated Spurious Emissions-FCC Part 2.1053/Part 22.917(a) .....	42
2.3. List of test equipments .....	45
Appendix .....	46

## 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.

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  
State Radio Spectrum Monitoring and Testing Center  
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

### 1.3 Applicant's details

Company: ZTE Corporation  
Address: 10# TangYan Road South, Hi-Tech Industrial Park, 710065  
City: Xi'an  
Country or Region: P.R.China  
Grantee Code: Q78  
Contacted person: Wang Lei  
Tel: +86-029-88724011  
Fax: +86-029-88723249  
Email: wang.lei57@zte.com.cn

### 1.4 Manufacturer's details

Company: ZTE Corporation  
Address: Zhongxing Bldg, Hi-Tech Park, NanShan, 518057  
City: Shenzhen  
Country or Region: P.R.China  
Grantee Code: Q78  
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: 23<sup>th</sup> Apr 2010  
 Date of test: 29<sup>th</sup> Apr 2010 to 8<sup>th</sup> Jun 2010

## 1.6 Reference specification

FCC Part 24E, Part22H, Part 2 (October 1, 2008 edition)

## 1.7 Information of EUT

### 1.7.1 General information

Name of EUT	GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA Module
FCC ID	Q78-ZTEMF210V
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	BPSK
Emission Designator	4M50F9W
Duplex mode	FDD
Duplex spacing:	WCDMA Band II:80MHz WCDMA Band V:45MHz
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	MF210V-1.0.0
SW Version	BD_MF210VV0.0.0B01

### 1.7.2 EUT details

Name	Model	IMEI
GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA Module	MF210V	352545040000200

### 1.7.3 Auxiliary equipment details

Equipment	USB docking card
Manufacturer	ZTE Corporation
Model Number	-----

Equipment	Notebook
Manufacturer	IBM
Model Number	T23

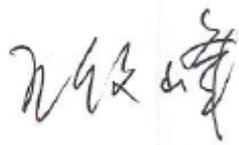
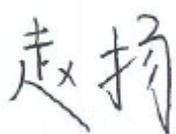
## 2. Test information

### 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	2.1055/24.235	Pass
8	Radiated Spurious Emissions	2.1051/22.917/24.238	Pass

\*Note: The device MF210V (FCC ID: Q78-ZTEMF210V) is designed as module to be installed in other devices. This device is to be used only for fixed and mobile applications. If the final product after integration is intended for portable use, a new application and FCC is required.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20cm from all the persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

This Test Report Is Issued by: Mr. Song Qizhu, Director of the test lab 	Checked by: 
Tested by: 	Issued date: <b>2010.06.09</b>

## 2.2 Test result

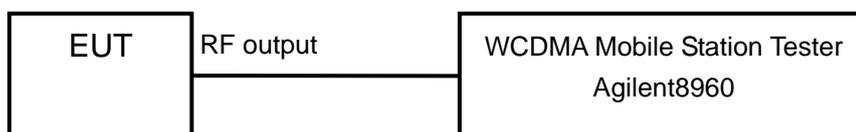
### 2.2.1 WCDMA Band II

#### 2.2.1.1 RF Power Output-FCC Part 22.913(a)/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	$\leq 24\text{dBm}$
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Test result:

WCDMA Band II:

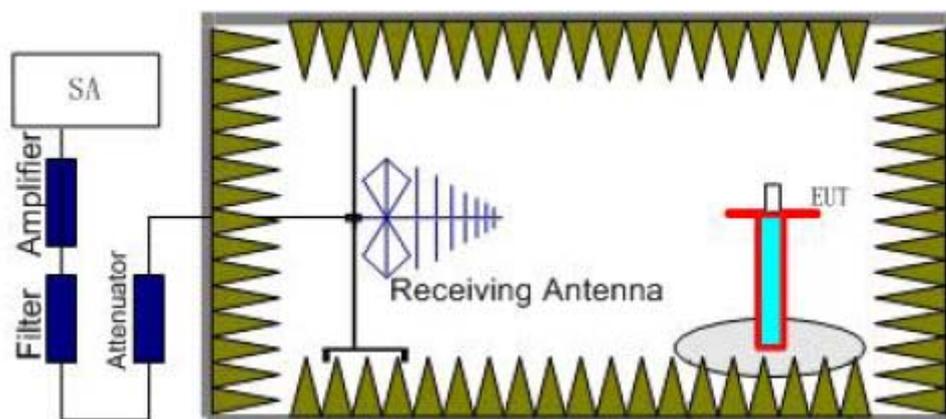
Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
1852.4	9262	21.7
1880.0	9400	21.4
1907.6	9538	21.3

### 2.2.1.2 Effective Radiated Power-FCC Part 22.913(a)/Part 24.232(b)

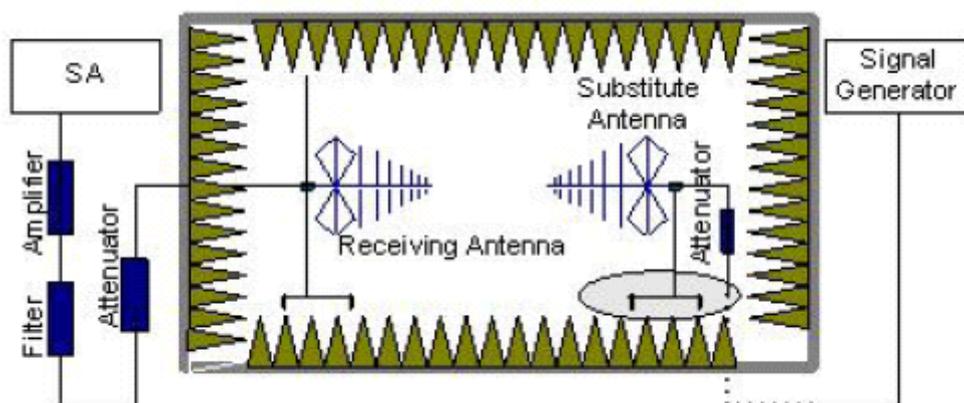
Ambient condition:

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

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

WCDMA band II

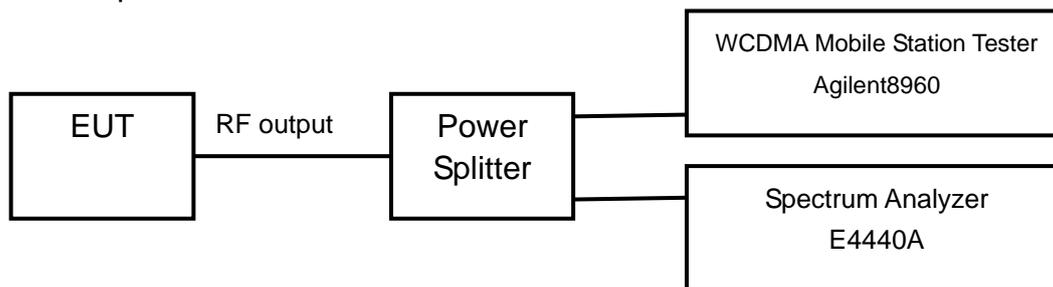
Carrier frequency (MHz)	Channel No.	E.R.P. (dBm)
1852.4	9262	15.8
1880.0	9400	15.6
1907.6	9538	15.7

### 2.2.1.3 Occupied Bandwidth-FCC Part2.1049(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)

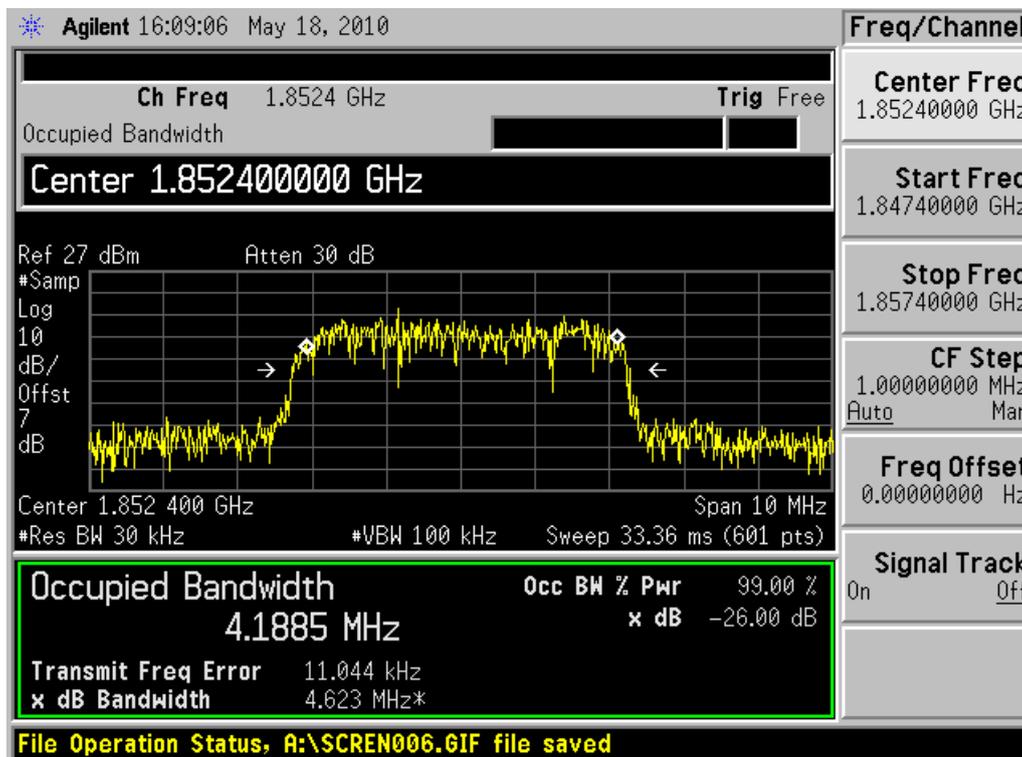
Limits: No specific occupied bandwidth requirements in part 2.1049

Test result:

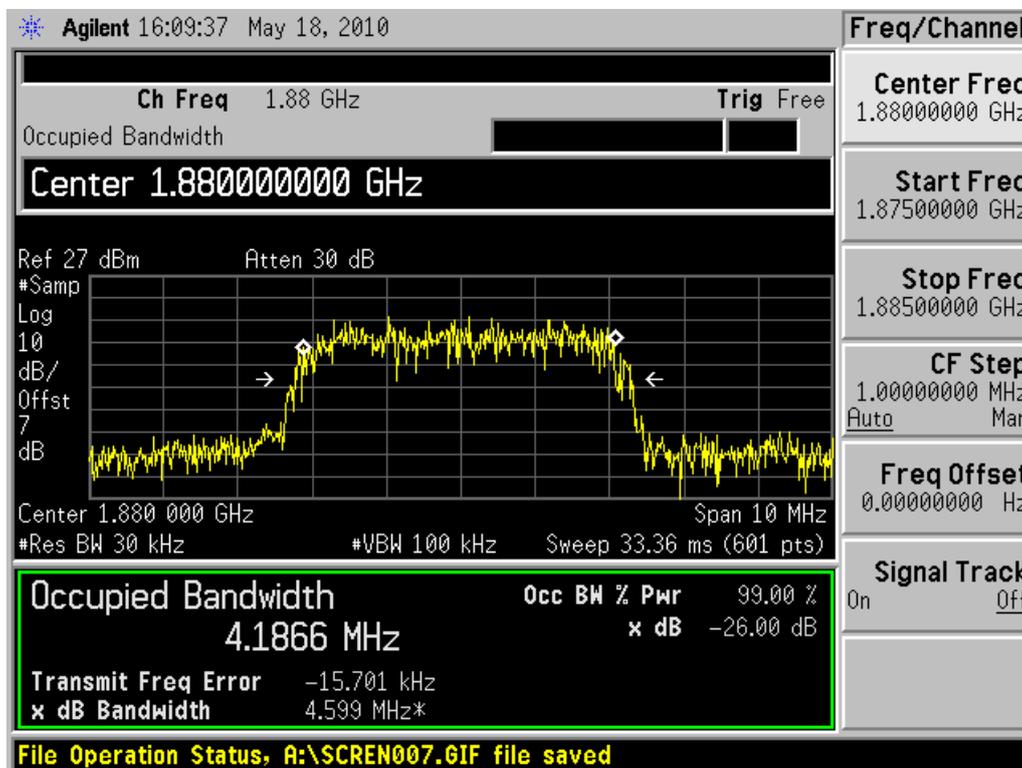
WCDMA band II:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (MHz)
1852.4	9262	4.1885
1880.0	9400	4.1866
1907.6	9538	4.1503

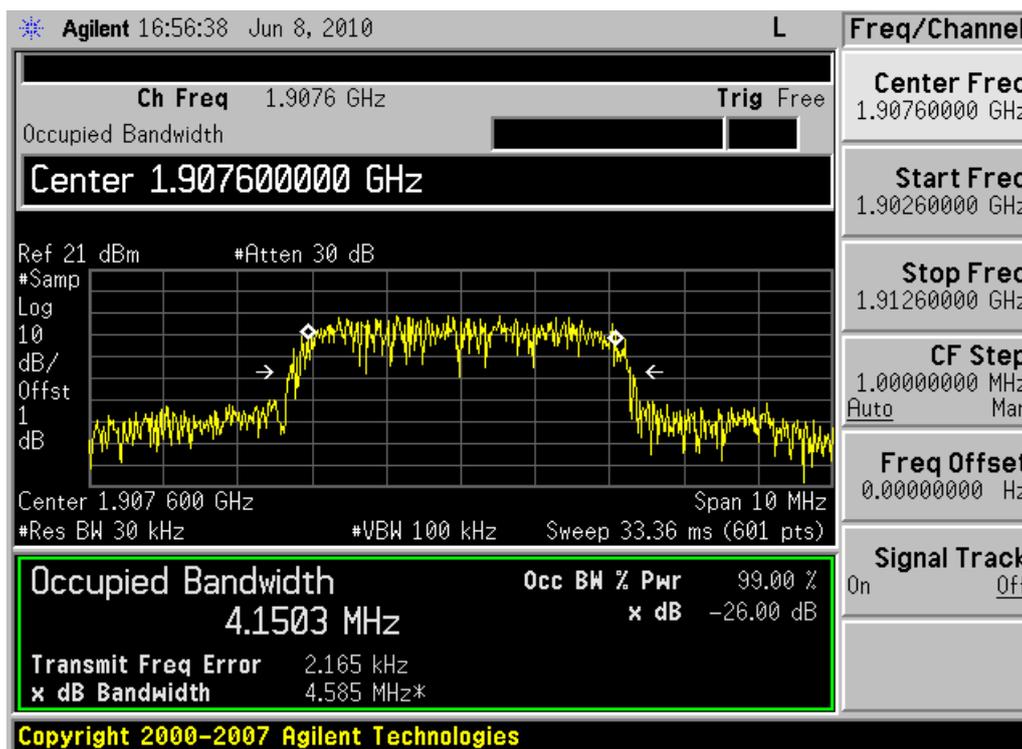
WCDMA band II:



Channel 9262



Channel 9400



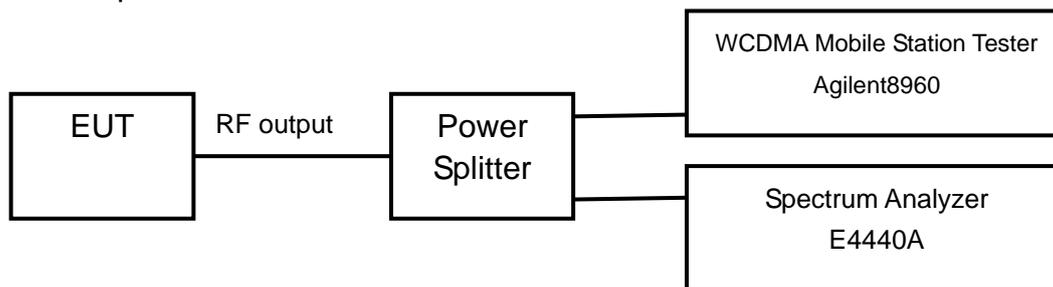
Channel 9538

### 2.2.1.4 Emission Bandwidth-FCC Part 22.917(b)/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)

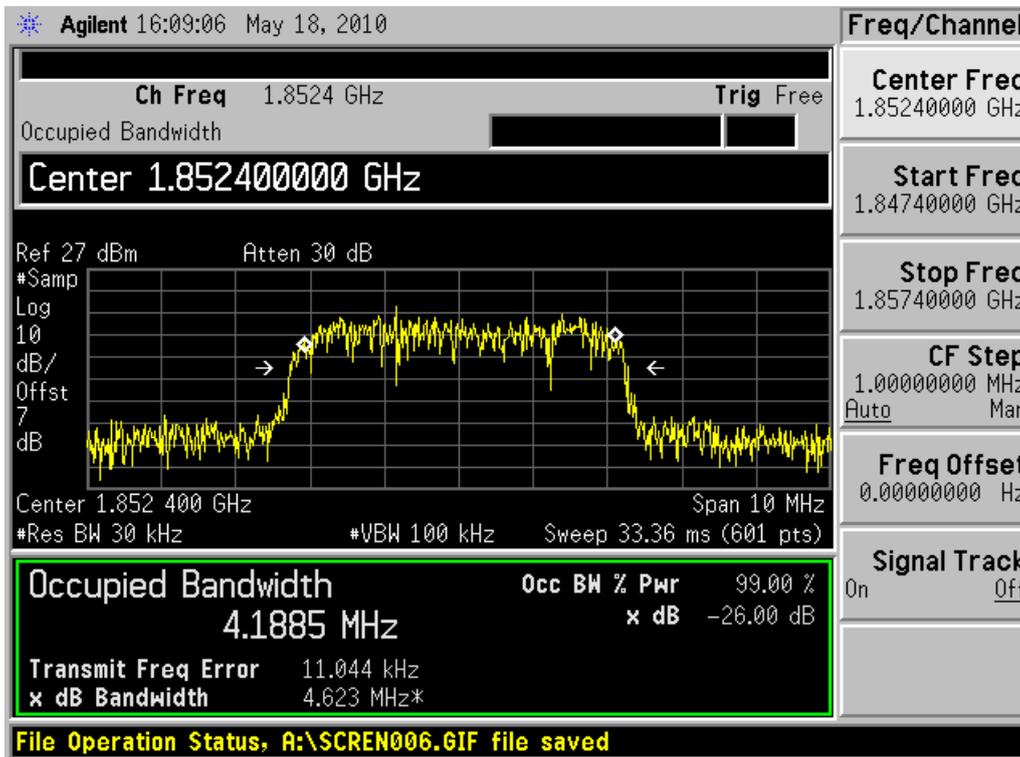
Limits: No specific occupied bandwidth requirements in part 22.917/24.238

Test result:

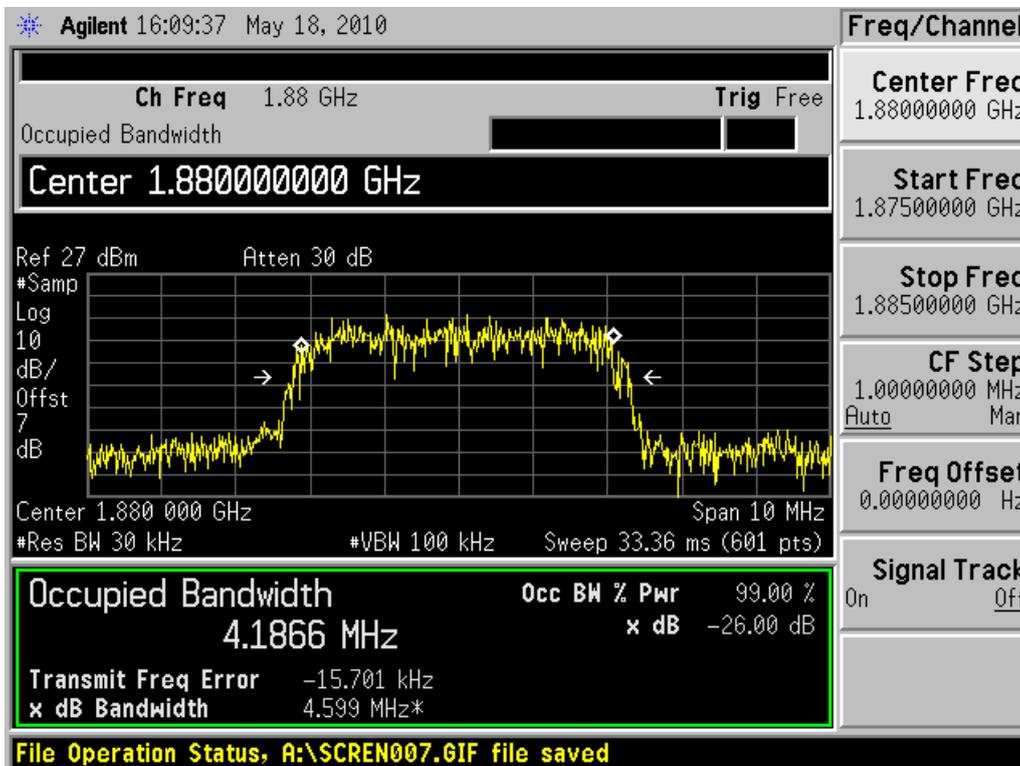
WCDMA band II:

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dBc Power (MHz)
1852.4	9262	4.623
1880.0	9400	4.599
1907.6	9538	4.585

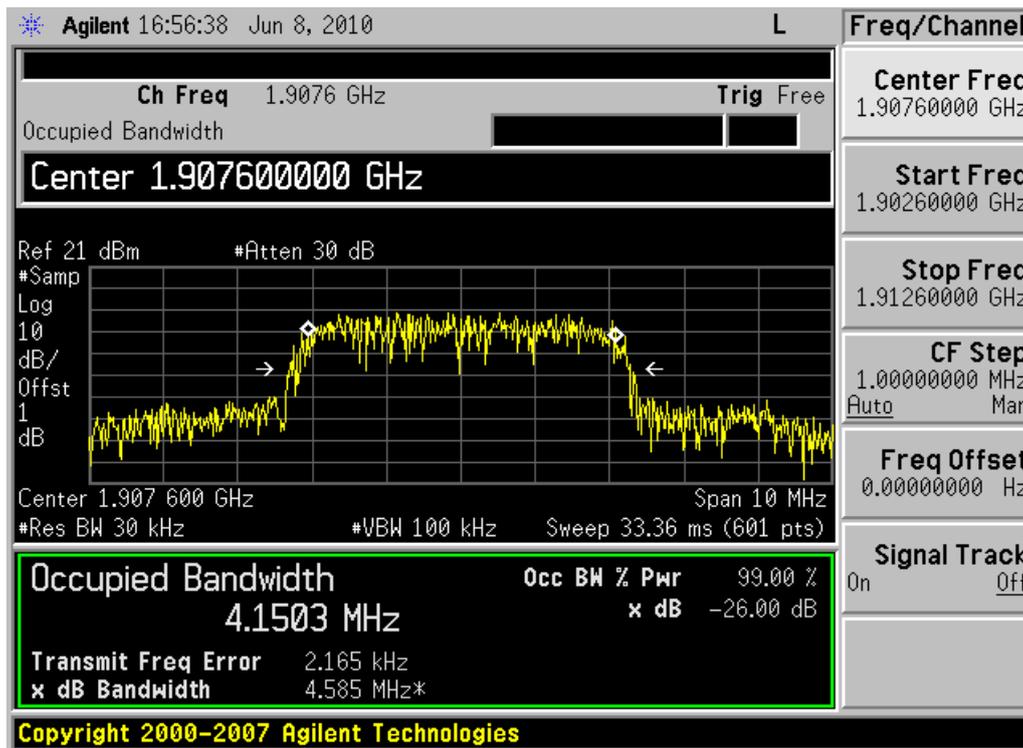
WCDMA band II:



Channel 9262



Channel 9400



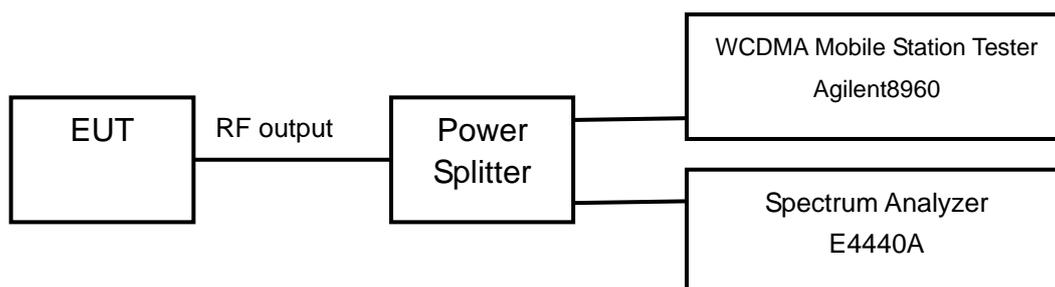
Channel 9538

### 2.2.1.5 Conducted Spurious Emissions-FCC Part2.1057/22.917/24.238

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

Test Setup:



Test procedure:

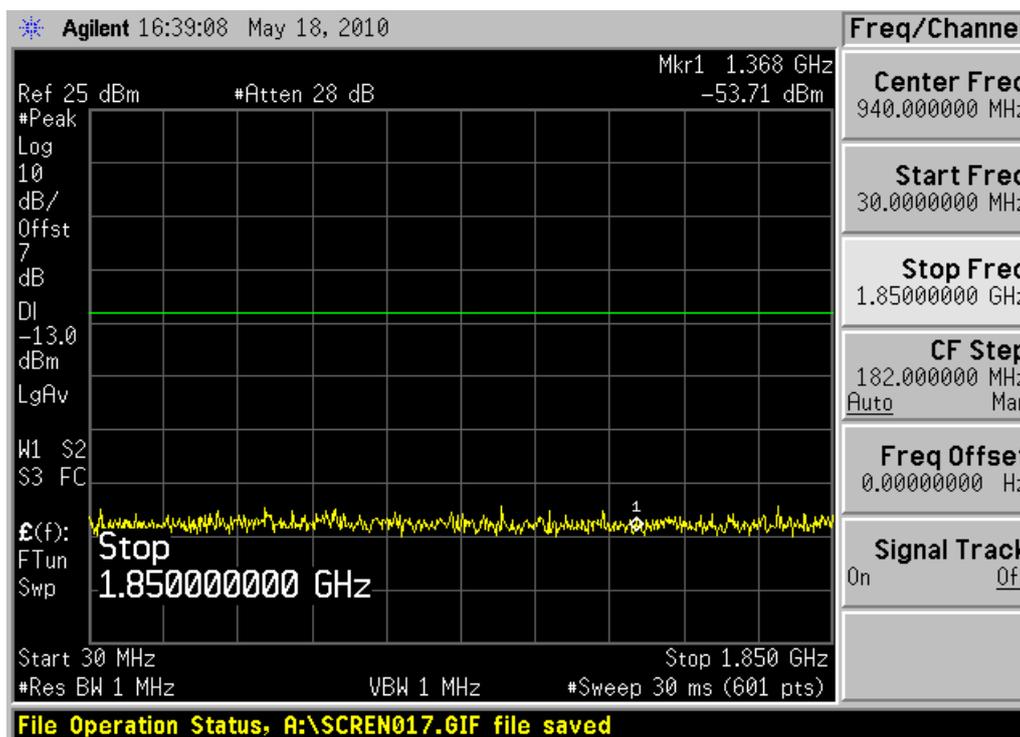
After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to 20GHz (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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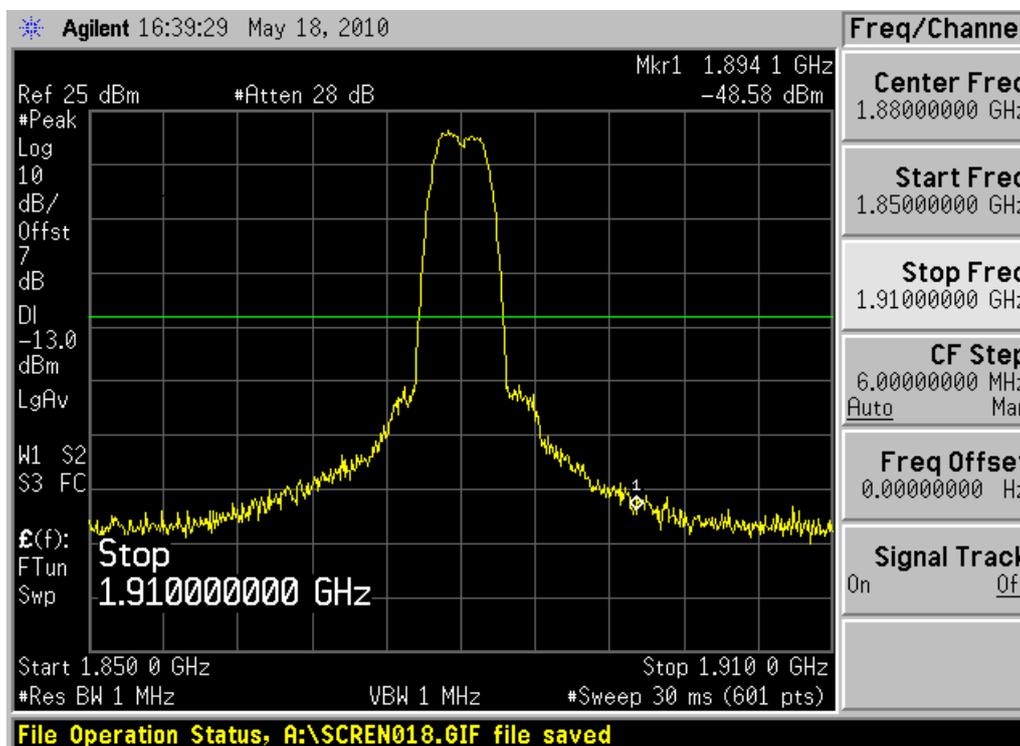
Test result:

Refer to the following figures.

WCDMA band II:

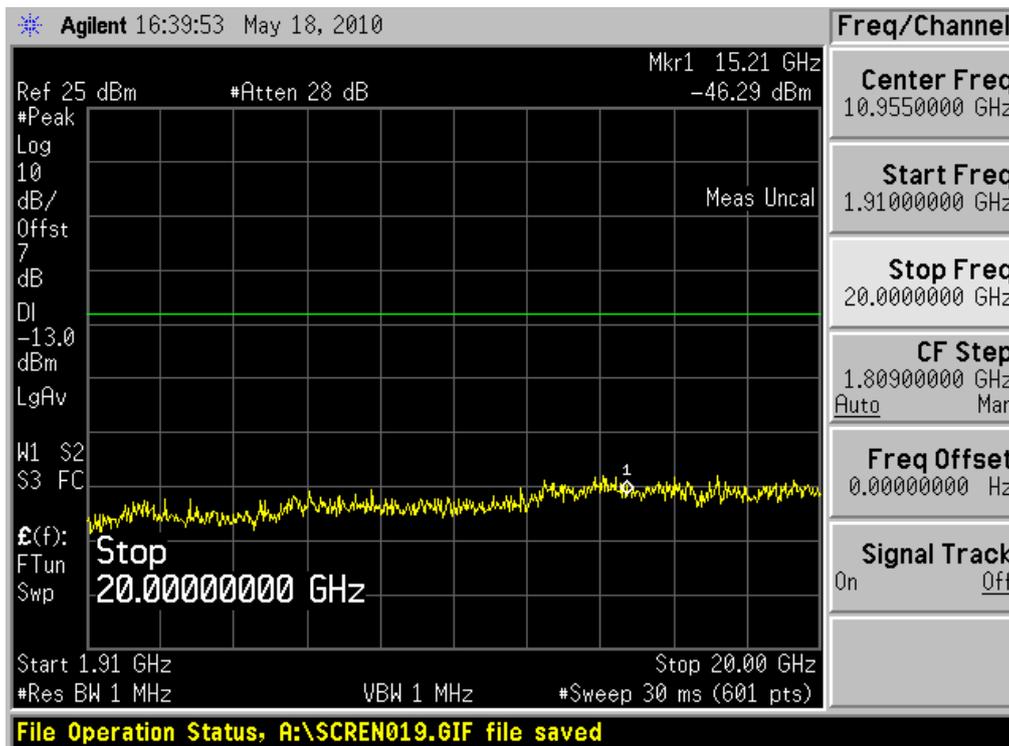


Channel 9400, 30MHz~1850MHz



Channel 9400, 1850MHz~1910MHz

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



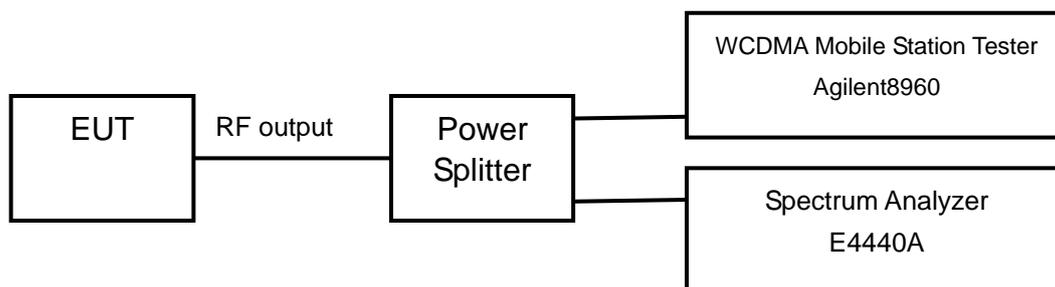
Channel 9400, 1910MHz~20GHz

### 2.2.1.6 Band Edges Compliance-FCC Part 22.917(b)/ 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.

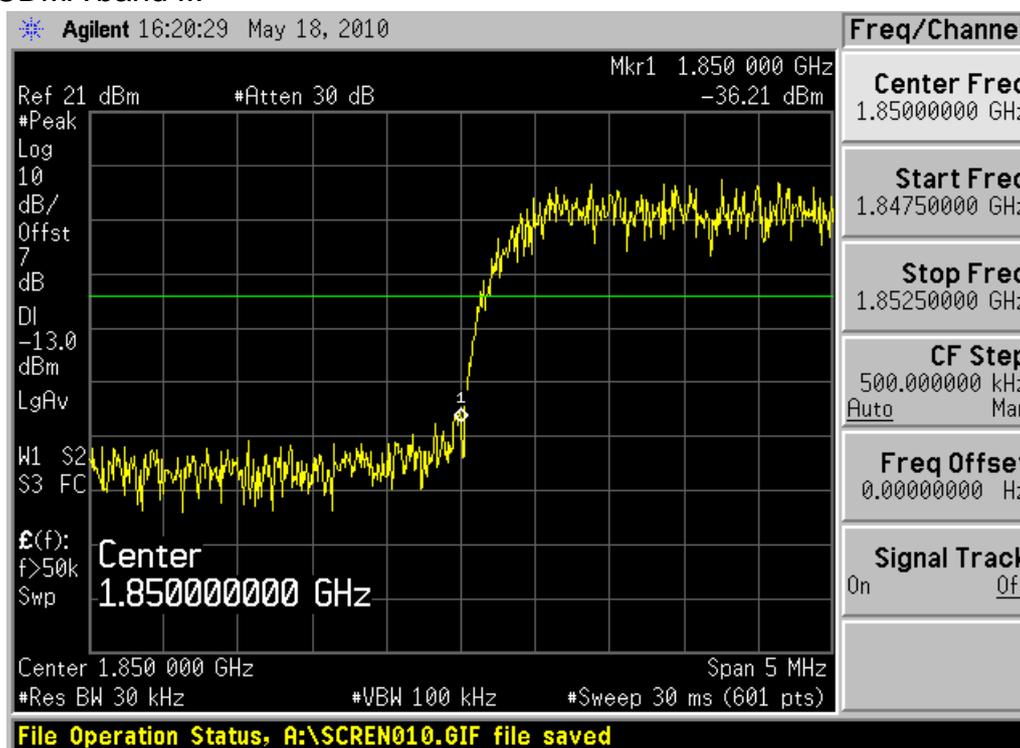
The measurement will be conducted at two channels No9262 and No9538 (Bottom and top channels of WCDMA band II)

Limits	≤ -13dBm
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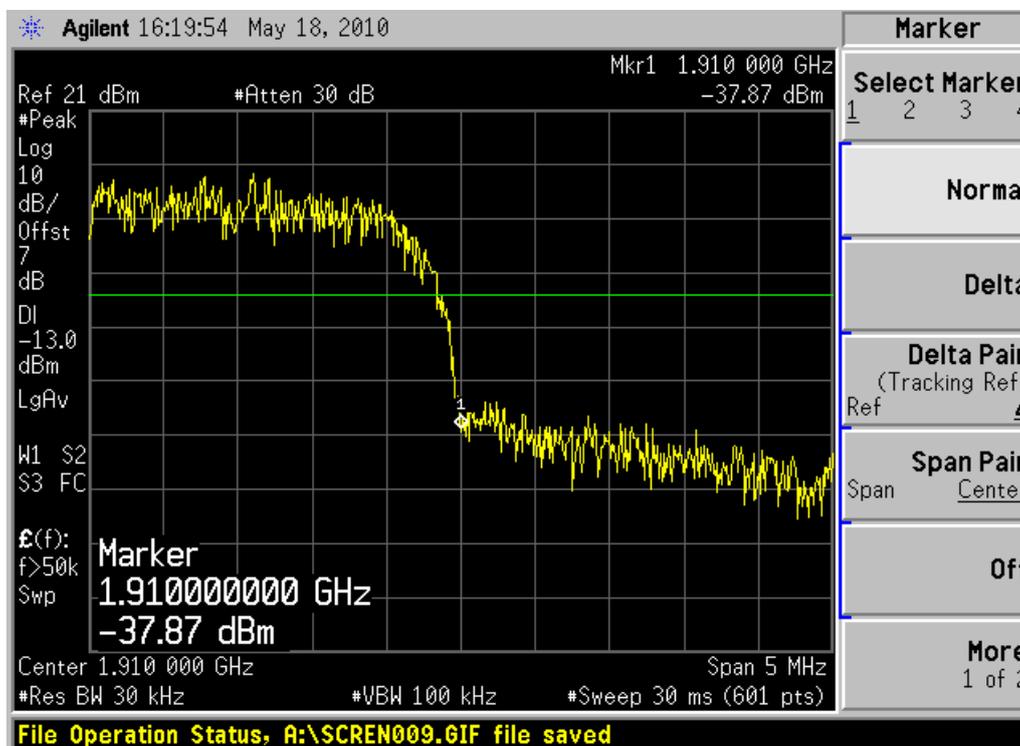
Test result:

Refer to the following figures.

WCDMA band II:



Channel 9262



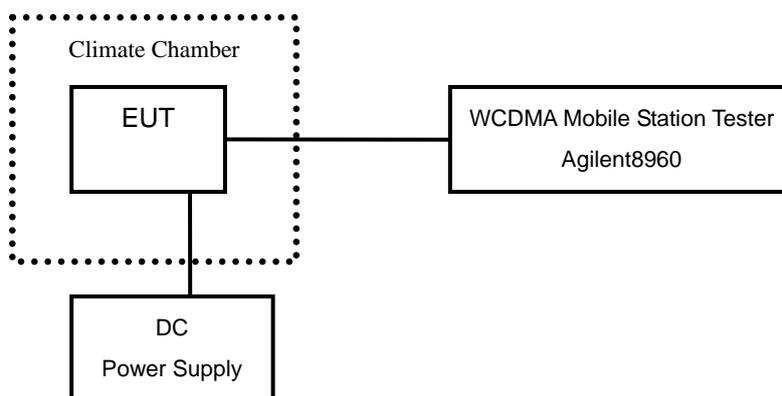
Channel 9538

### 2.2.1.7 Frequency Stability-FCC Part2.1055/Part24.235

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

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

Test result:

WCDMA band II:

Temperature(°C)	Test Result (ppm)@3.3V		
	Channel 9262	Channel 9400	Channel 9538
-30	0.002	0.001	0.001
-20	0.002	0.001	0.001
-10	0.002	0.003	0.001
0	0.001	0.003	0.001
+10	0.002	0.001	0.002
+20	0.001	0.001	0.001
+30	0.002	0.002	0.002
+40	0.002	0.004	0.001
+50	0.002	0.001	0.001

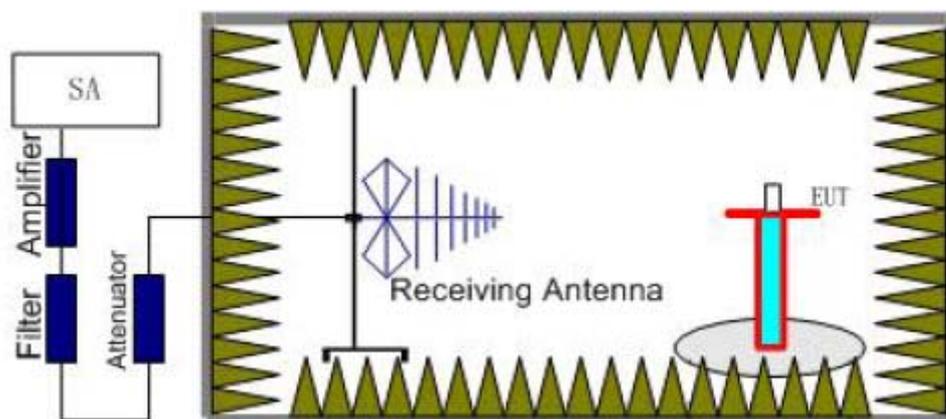
Voltage (V)	Test Result (ppm)@20°C		
	Channel 9262	Channel 9400	Channel 9538
3.2	0.002	0.001	0.000
3.6	0.002	0.002	0.002

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

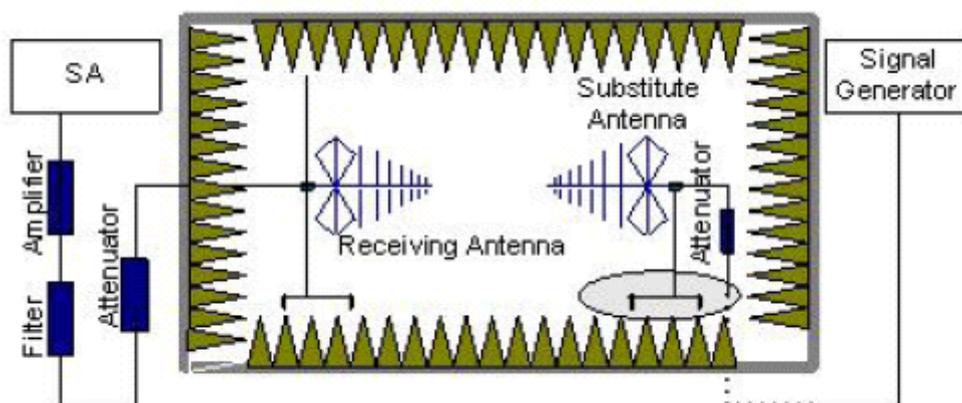
Ambient condition

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 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.

$$P=P_R+L_C+L_A-G=-60+10+30-11=-31dBm$$

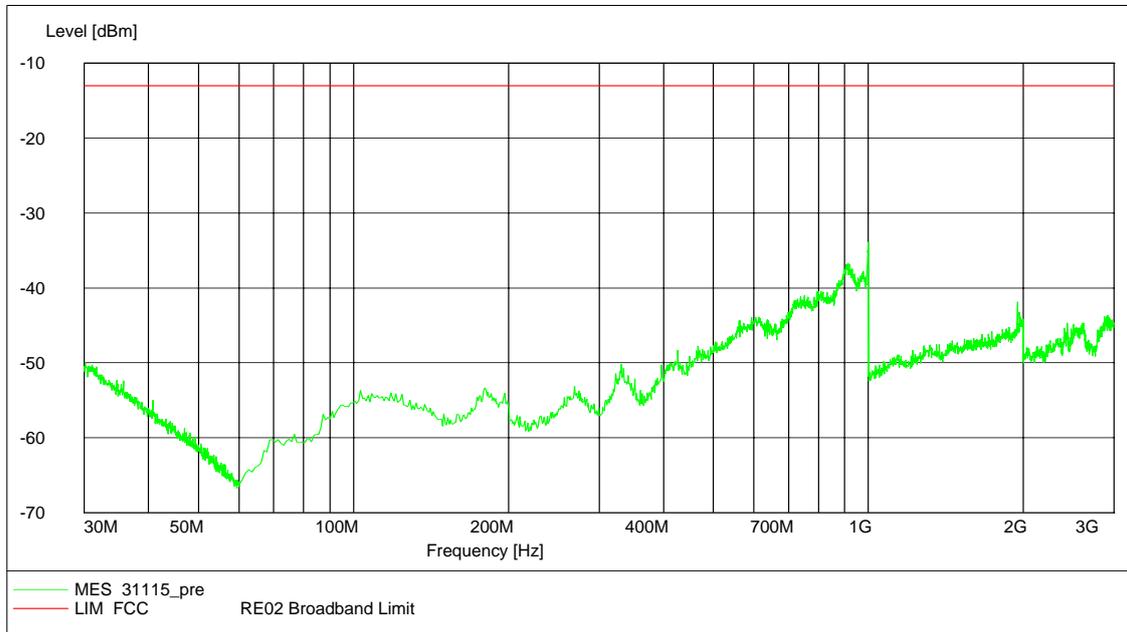
The measurement will be conducted at one channel No9400 (middle channels of WCDMA band II)

Limits	≤ -13dBm
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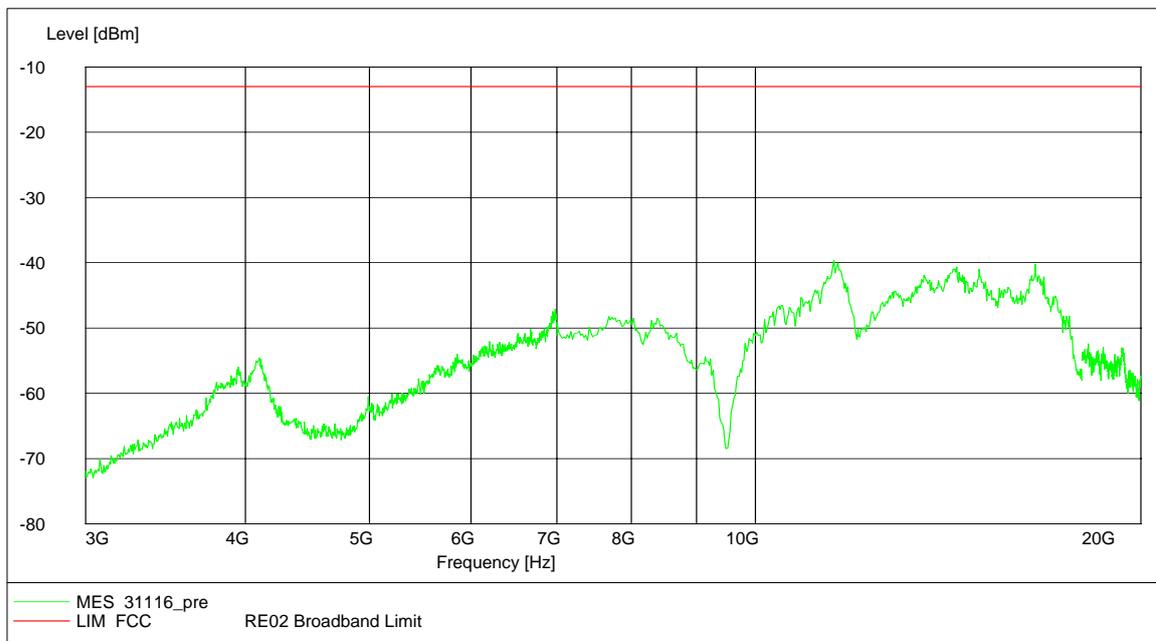
Test result:

Refer to the following figures.

### WCDMA band II:



### Channel 9400, 30MHz~3GHz



### Channel 9400, 3GHz~20GHz

## 2.2 Test result

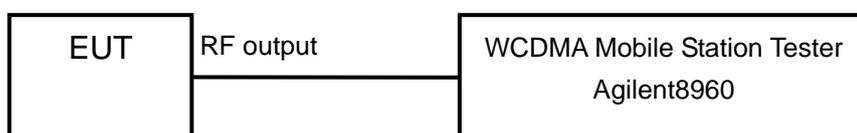
### 2.2.2 WCDMA Band V

#### 2.2.2.1 RF Power Output-FCC Part 22.913(a)/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 No4132, No4183 and No4233 (Bottom, middle and top channels of WCDMA band V)

Limits	$\leq 24\text{dBm}$
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Test result:

WCDMA Band V:

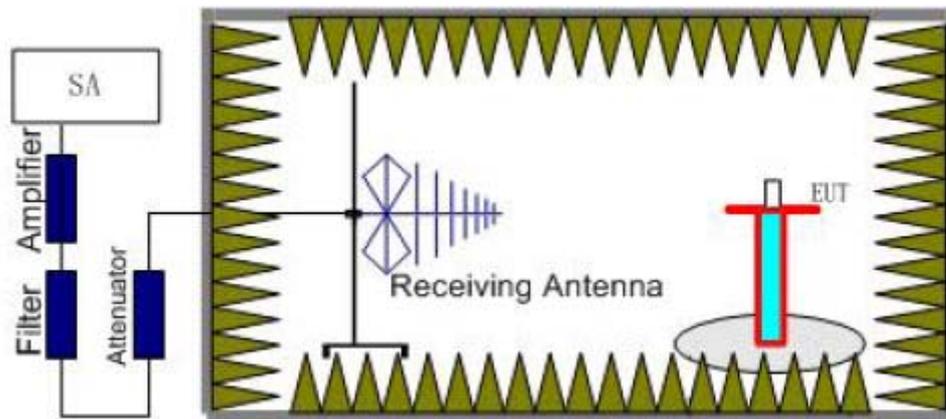
Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
826.4	4132	21.8
836.6	4183	22.0
846.6	4233	21.8

### 2.2.2.2 Effective Radiated Power-FCC Part 22.913(a)/Part 24.232(b)

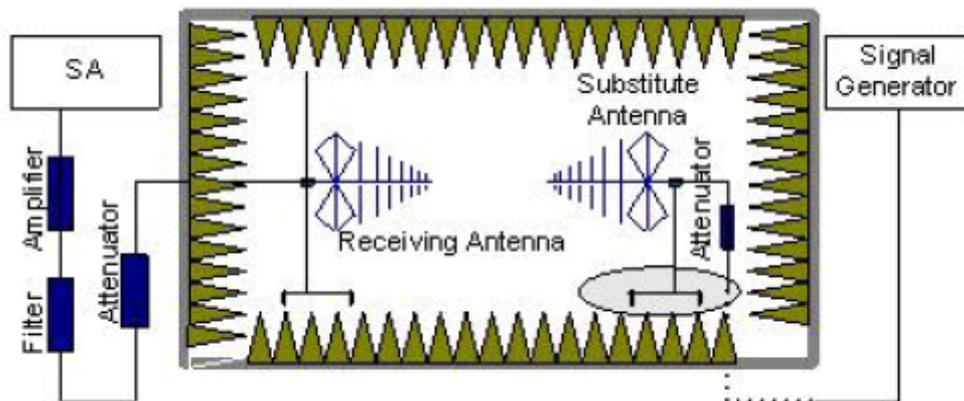
Ambient condition:

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 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 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:

WCDMA band V

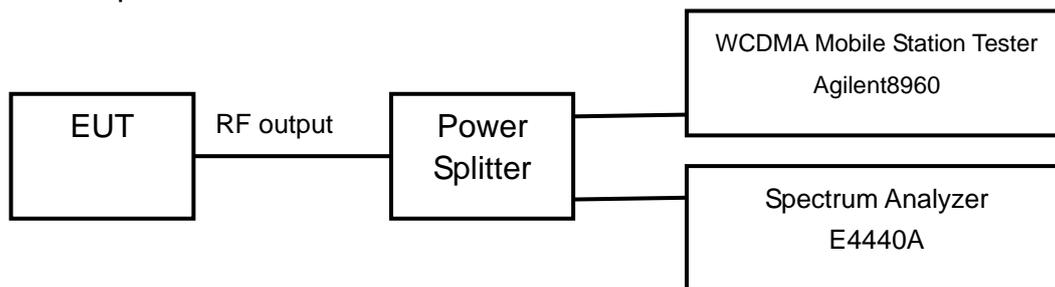
Carrier frequency (MHz)	Channel No.	E.R.P. (dBm)
826.4	4132	16.0
836.6	4183	15.8
846.6	4233	15.9

### 2.2.2.3 Occupied Bandwidth-FCC Part2.1049(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)

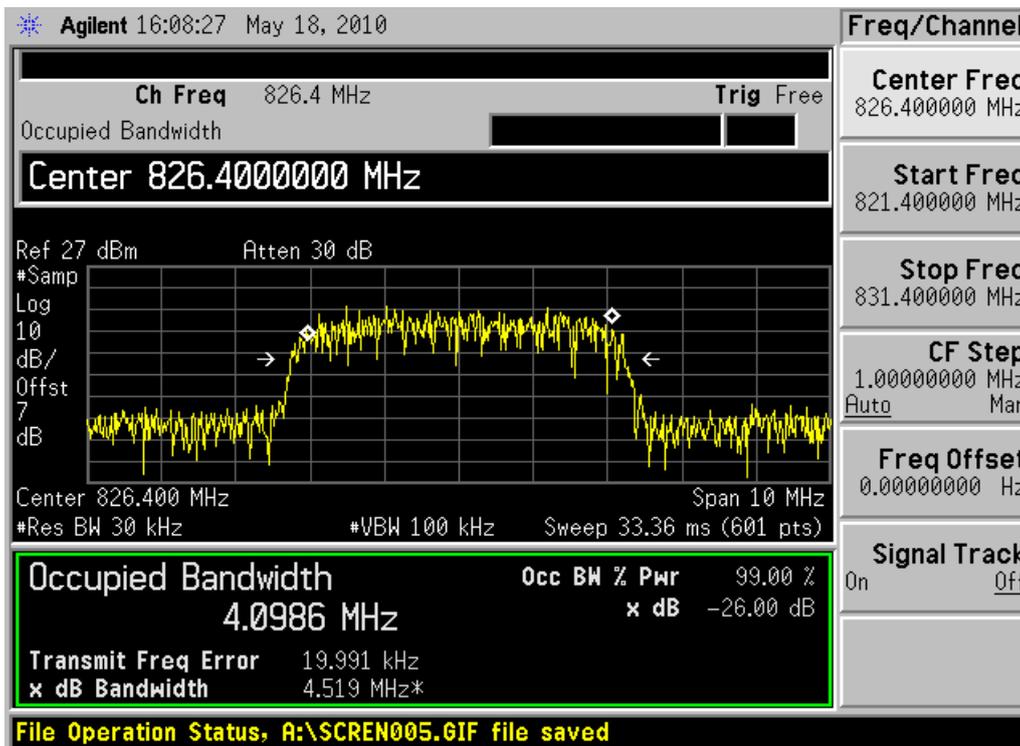
Limits: No specific occupied bandwidth requirements in part 2.1049

Test result:

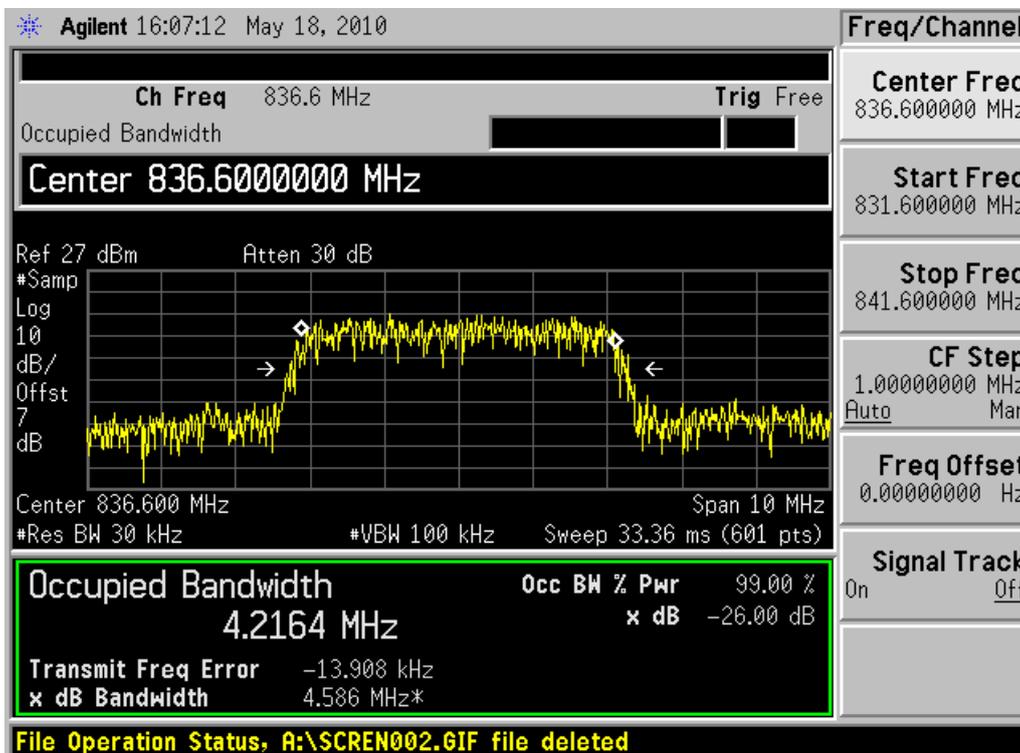
WCDMA band V:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (MHz)
826.4	4132	4.0986
836.6	4183	4.2164
846.6	4233	4.2264

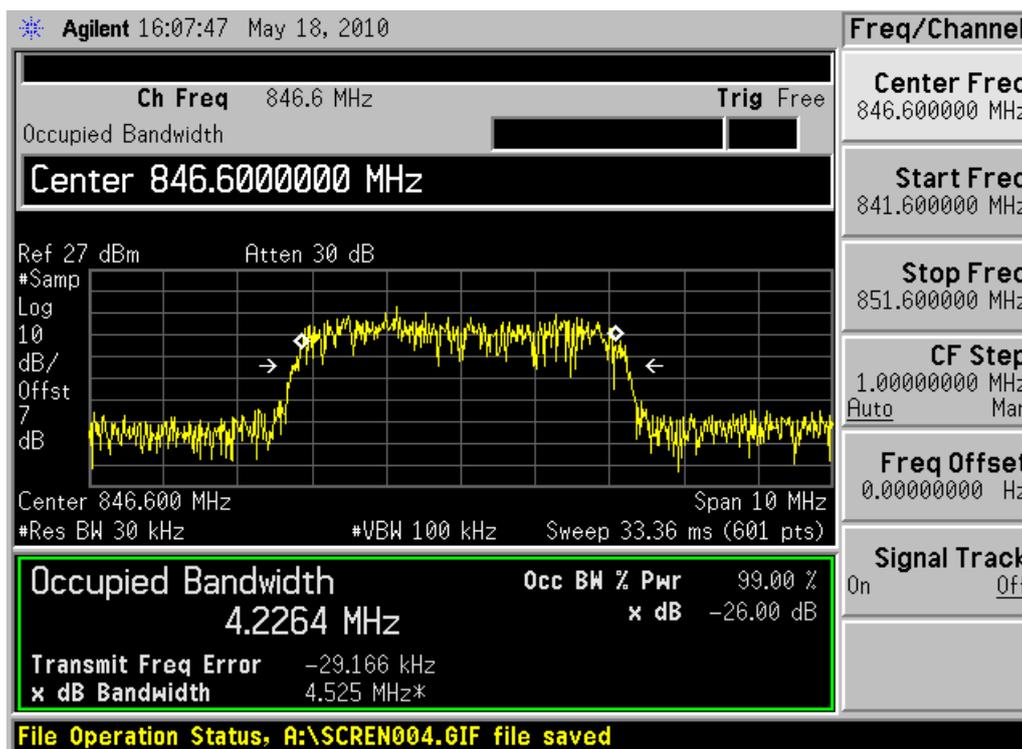
WCDMA band V:



Channel 4132



Channel 4183



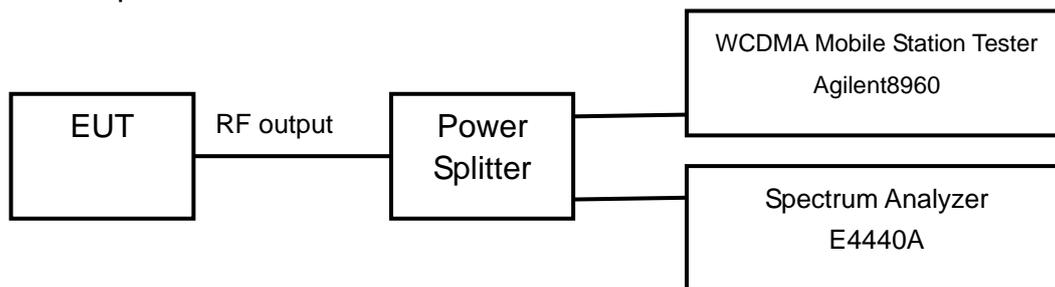
Channel 4233

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

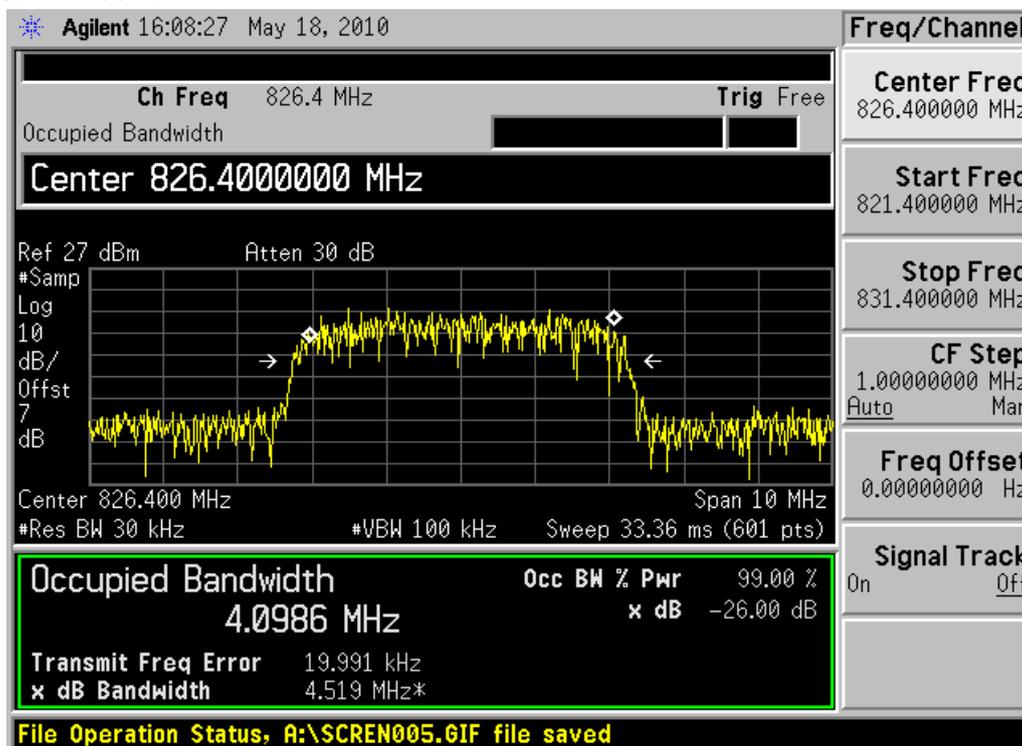
Limits: No specific occupied bandwidth requirements in part 22.917/24.238

Test result:

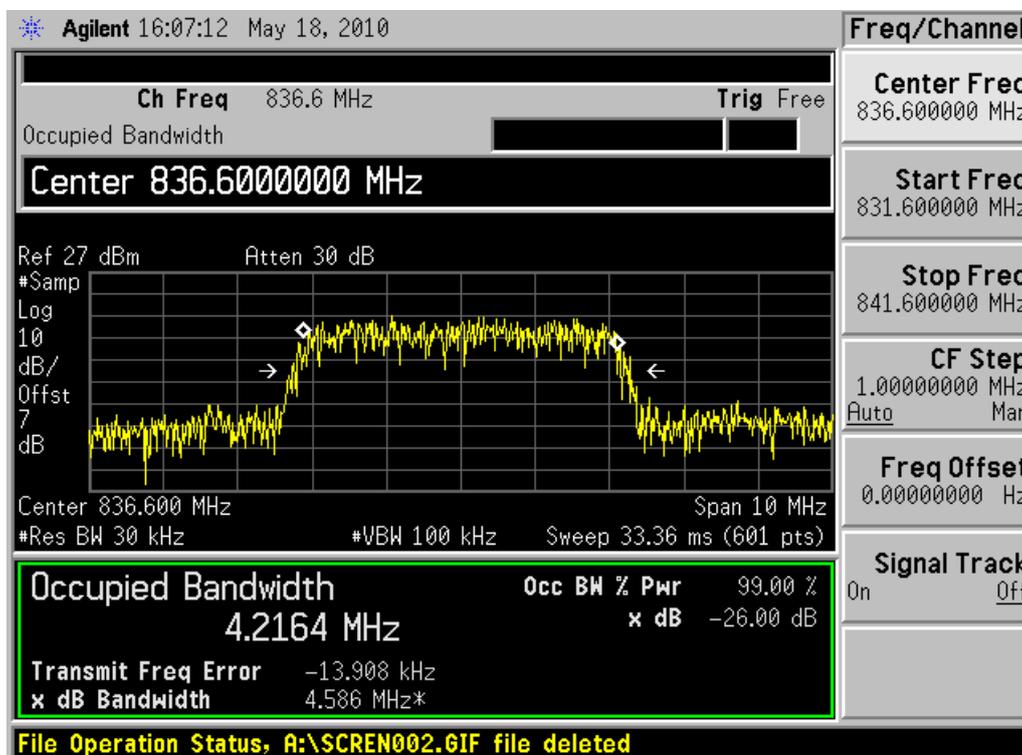
WCDMA band II:

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dBc Power (MHz)
826.4	4132	4.519
836.6	4183	4.586
846.6	4233	4.525

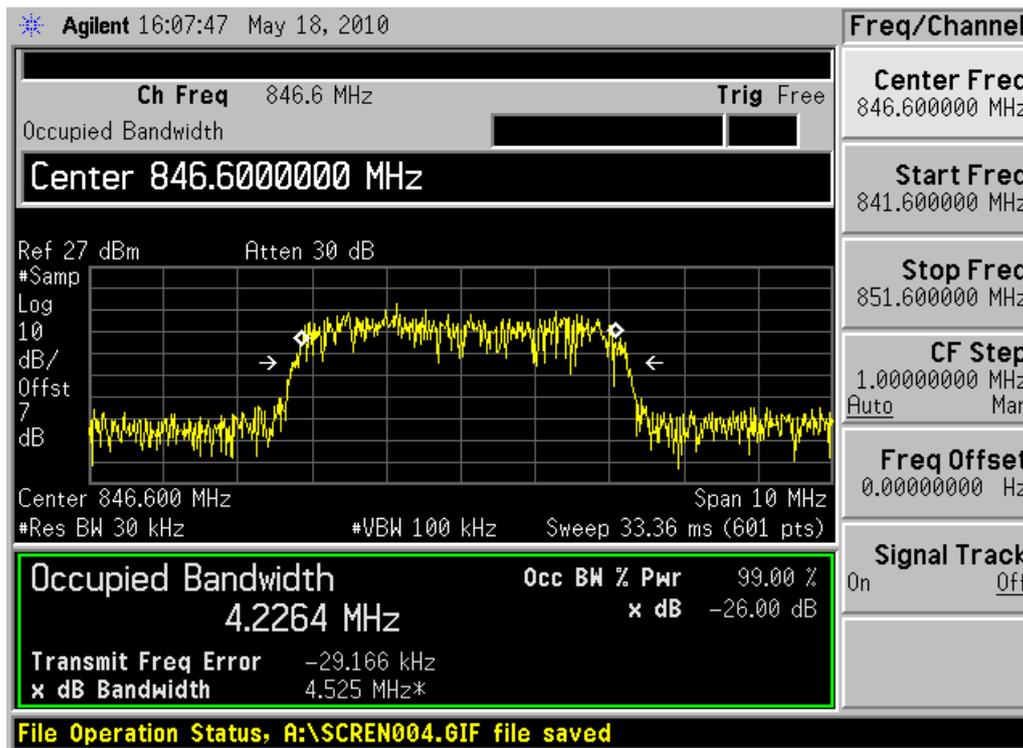
WCDMA band V:



Channel 4132



Channel 4183



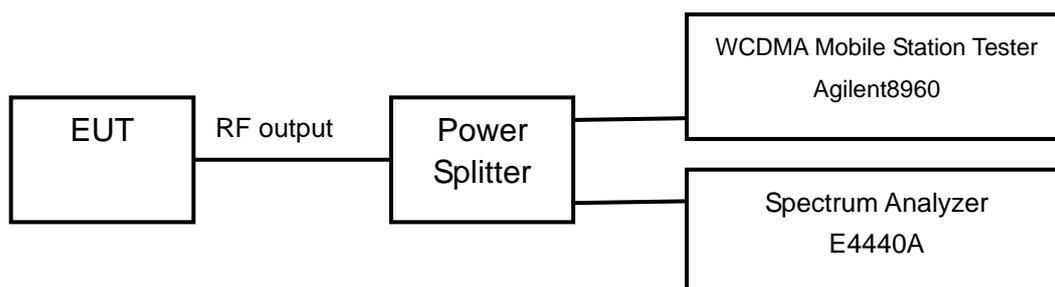
Channel 4233

### 2.2.2.5 Conducted Spurious Emissions-FCC Part2.1057/22.917/24.238

Ambient condition:

Temperature	Relative humidity	Pressure
21°C	44%	101.5kPa

Test Setup:



Test procedure:

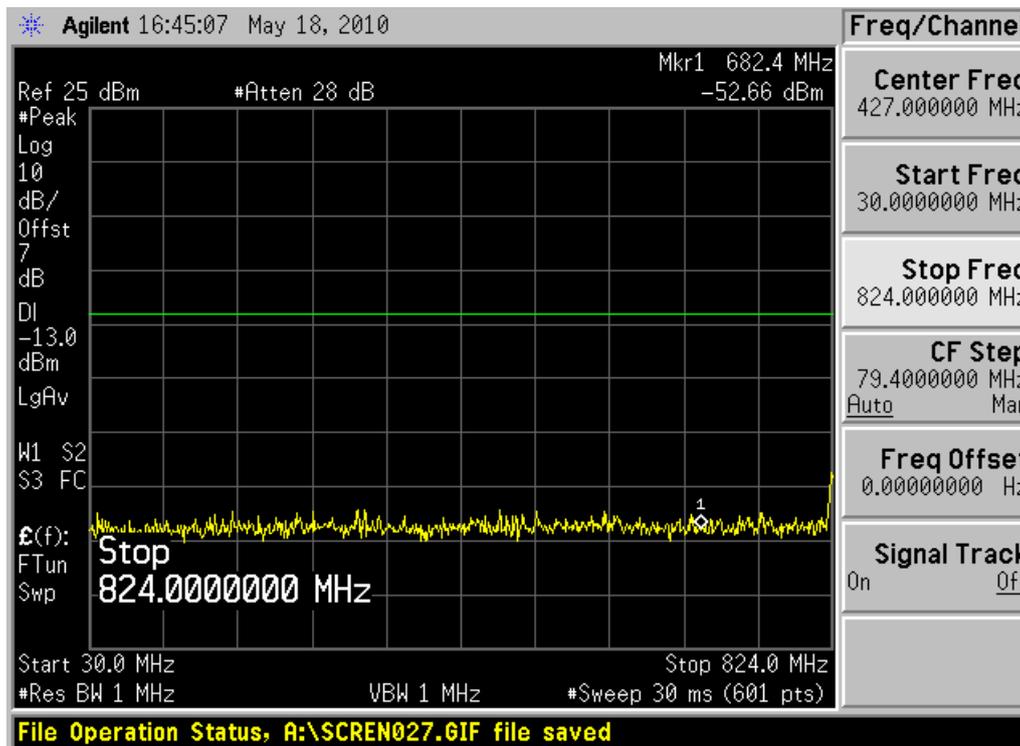
After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to 9GHz (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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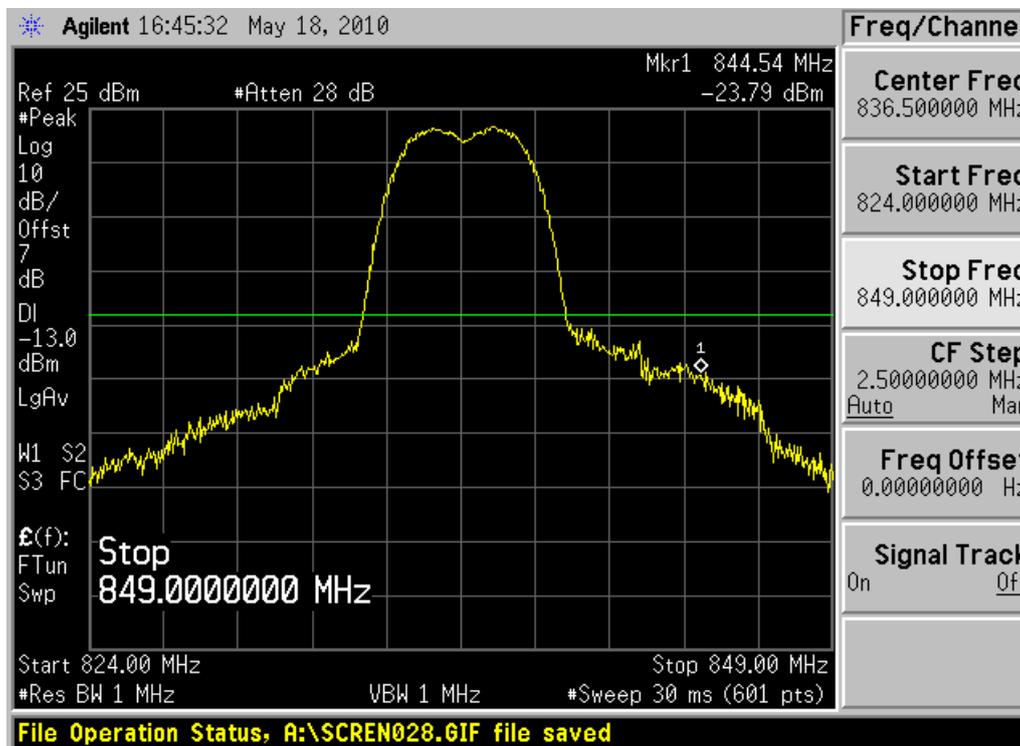
Test result:

Refer to the following figures.

WCDMA band V:

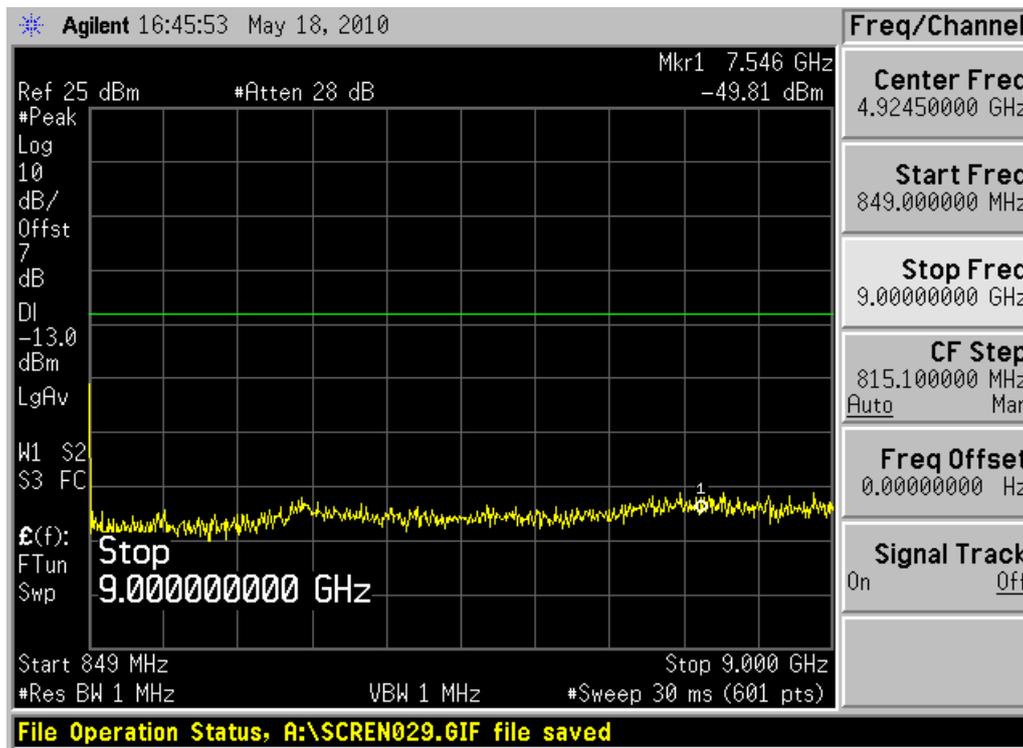


Channel 4183, 30MHz~824MHz



Channel 4183, 824MHz~849MHz

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



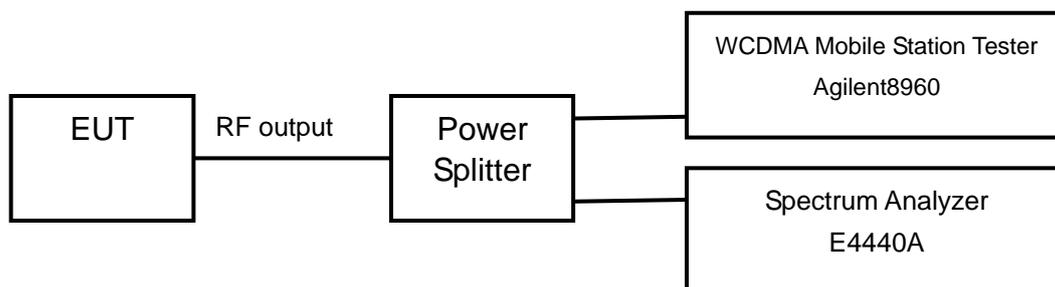
Channel 4183, 849MHz~9GHz

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

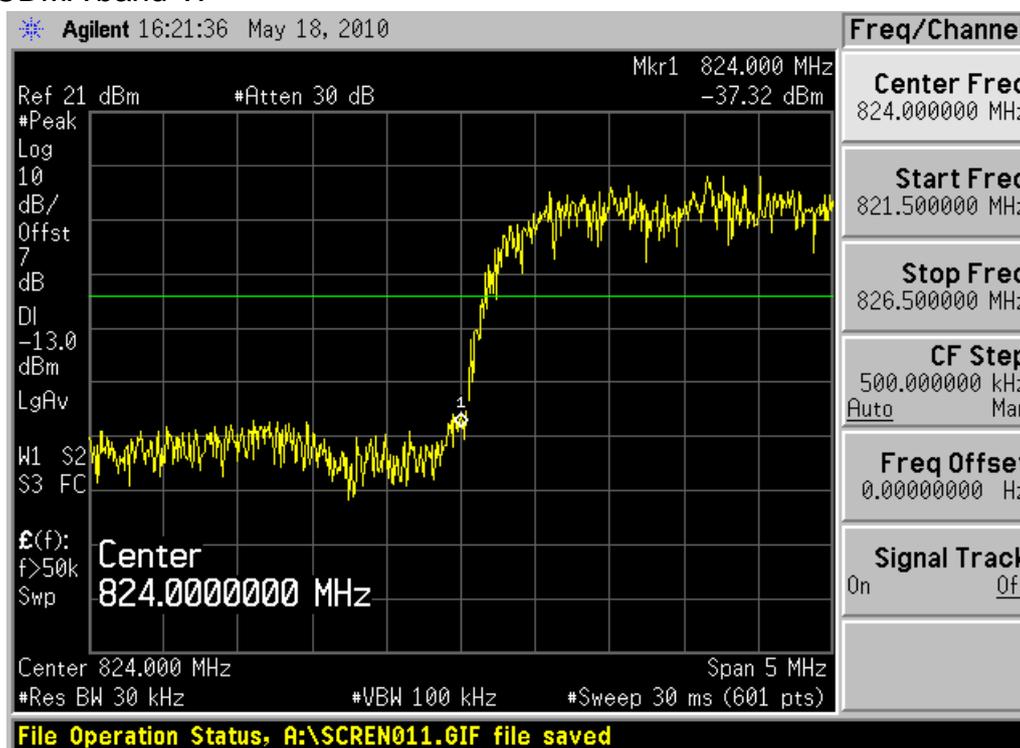
The measurement will be conducted at two channels No4132 and No4233 (Bottom and top channels of WCDMA band V)

Limits	≤ -13dBm
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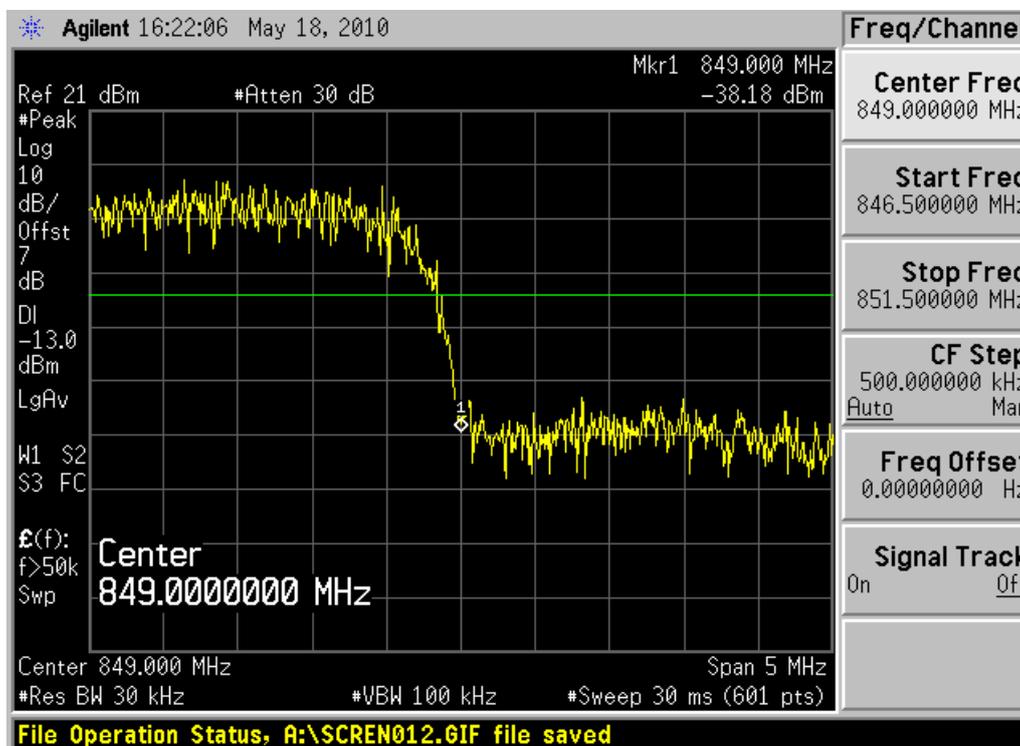
Test result:

Refer to the following figures.

WCDMA band V:



Channel 4132



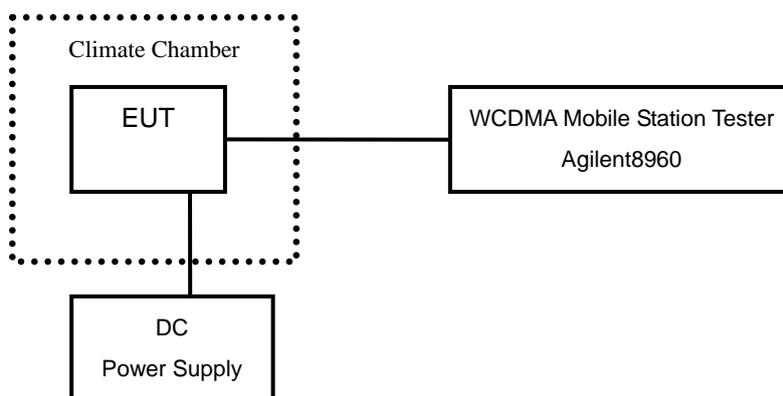
Channel 4233

### 2.2.2.7 Frequency Stability-FCC Part2.1055/Part24.235

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

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

Test result:

WCDMA band V:

Temperature(°C)	Test Result (ppm)@3.3V		
	Channel 4132	Channel 4183	Channel 4233
-30	0.002	0.001	0.001
-20	0.002	0.001	0.001
-10	0.002	0.003	0.001
0	0.001	0.003	0.001
+10	0.002	0.001	0.002
+20	0.001	0.001	0.001
+30	0.002	0.002	0.002
+40	0.002	0.004	0.001
+50	0.002	0.001	0.001

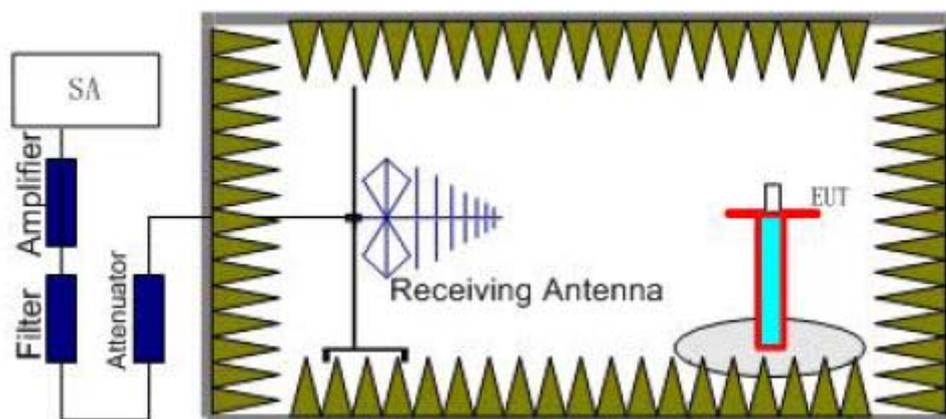
Voltage (V)	Test Result (ppm)@20°C		
	Channel 4132	Channel 4183	Channel 4233
3.2	0.002	0.001	0.000
3.6	0.002	0.002	0.002

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

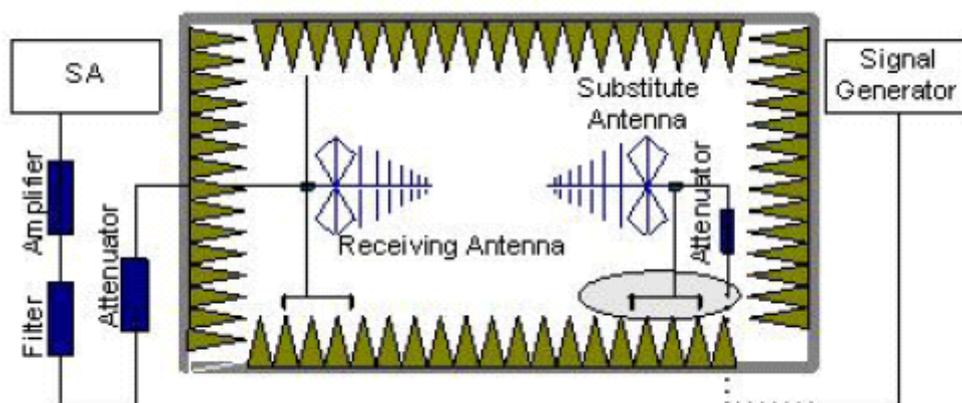
Ambient condition

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 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.

$$P=P_R+L_C+L_A-G=-60+10+30-11=-31dBm$$

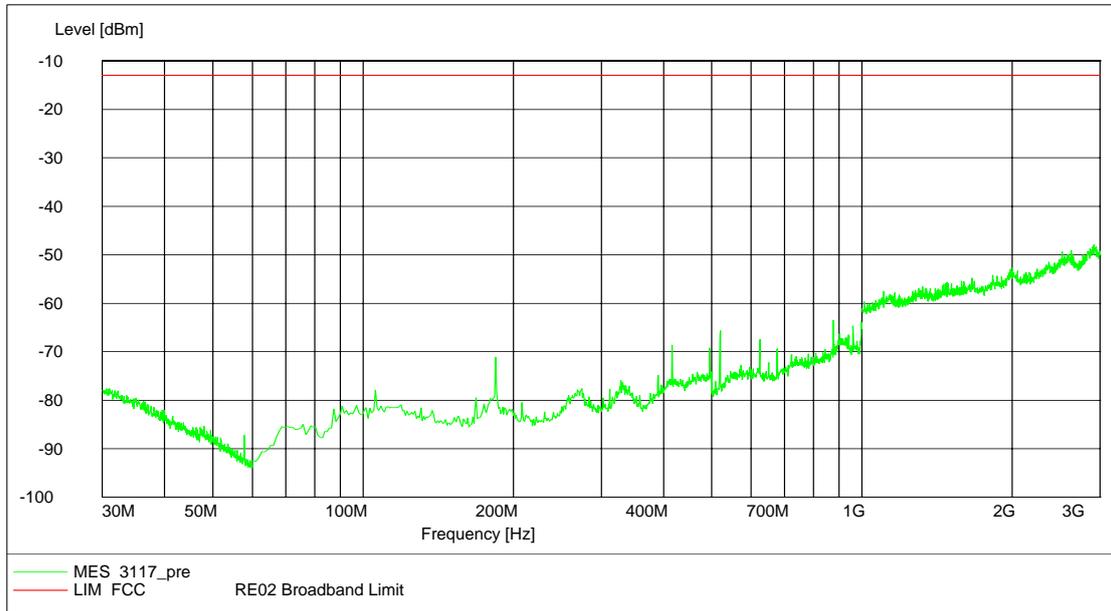
The measurement will be conducted at one channel No4183 (middle channels of WCDMA band V)

Limits	≤ -13dBm
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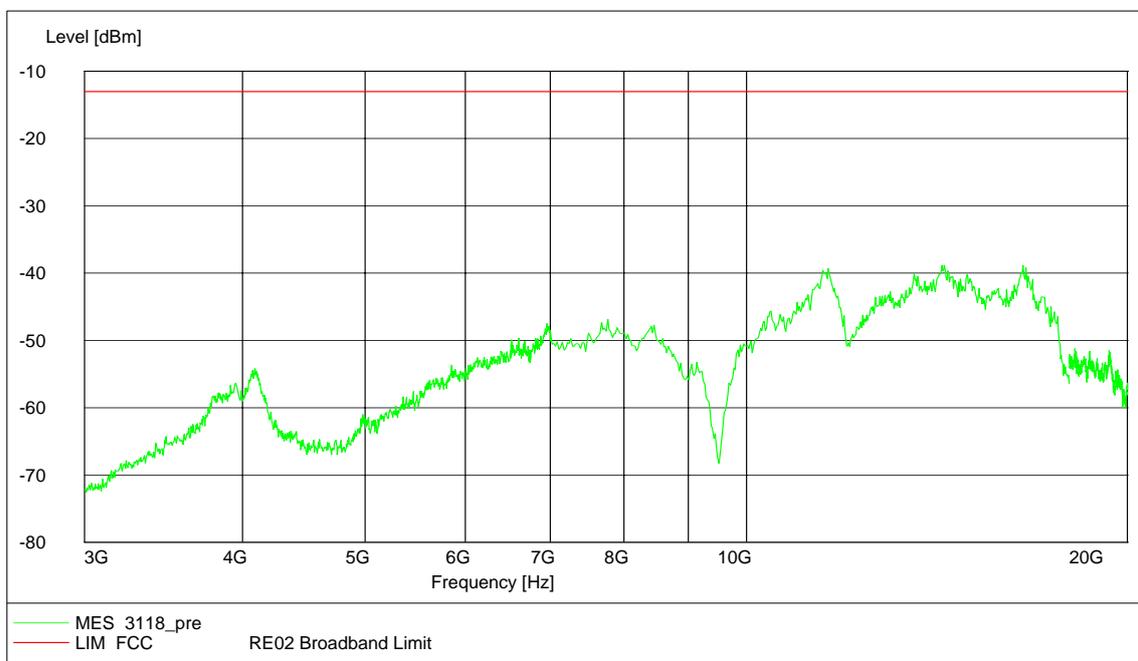
Test result:

Refer to the following figures.

WCDMA band V:



Channel 4183, 30MHz~3GHz



Channel 4183, 3GHz~20GHz

### 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. 2010
2	PSA E4440A Spectrum Analyzer	Agilent	MY41000183	19 <sup>th</sup> Aug. 2010
3	66309B DC Power Supply	Agilent	MY43000461	19 <sup>th</sup> Aug. 2010
4	1506A Power Splitter	Weinschel	MN154	19 <sup>th</sup> Aug. 2010
5	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	19 <sup>th</sup> Aug. 2010
6	ESI 40 EMI test receiver	R&S	100015	19 <sup>th</sup> Aug. 2010
7	SMR 20 Signal generator	R&S	100086	19 <sup>th</sup> Aug. 2010
8	CMU 200 Radio tester	R&S	100313	19 <sup>th</sup> Aug. 2010
9	12.65m*8.03m*7.50m Fully-Anechoic Chamber	FRANKONIA	-----	19 <sup>th</sup> Aug. 2010
10	HL562 Ultra log test antenna	R&S	100016	19 <sup>th</sup> Aug. 2010
11	23.18m×16.88m×9.60m Semi-Anechoic Chamber	FRANKONIA	-----	19 <sup>th</sup> Aug. 2010
12	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100030	19 <sup>th</sup> Aug. 2010
13	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100029	19 <sup>th</sup> Aug. 2010
14	PS2000 Turn Table	FRANKONIA	-----	19 <sup>th</sup> Aug. 2010
15	MA260 Antenna Master	FRANKONIA	-----	19 <sup>th</sup> Aug. 2010
16	SH-241 Climatic Chamber	ESPEC	92000389	19 <sup>th</sup> Aug. 2010
17	ES-K1 EMI test software	R&S	-----	19 <sup>th</sup> Aug. 2010
18	HL562 Receive antenna	R&S	100167	19 <sup>th</sup> Aug. 2010

## **Appendix**

### Appendix1 Test Setup