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# TEST REPORT

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Report No.: SRTC2011-H024-E0087

Product Name: CDMA 1X Wireless Phone

Product Model: ZTE WP228

Applicant: ZTE Corporation

Manufacturer: ZTE Corporation

Specification: FCC Part 22H, Part 2

(October 1, 2009 edition)

FCC ID: Q78-ZTEWP228

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

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The test results relate only to individual items of the samples which have been tested.

### 1.2 Information about the testing laboratory

Company: The State Radio\_monitoring\_center Testing Center (SRTC)  
Address: No.80 Beilishi Road, Xicheng District, Beijing China  
City: Beijing  
Country or Region: China  
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Email: wangjf@srrc.org.cn / wangjunfeng@srtc.org.cn

### 1.3 Applicant's details

Company: ZTE Corporation  
Address: ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park,  
Nanshan District, 518057  
City: Shenzhen  
Country or Region: P.R.China  
Grantee Code: Q78  
Contacted person: Min Zhang  
Tel: +86-021-68897541  
Fax: +86-021-50801070  
Email: zhang.min13@zte.com.cn

### 1.4 Manufacturer's details

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

## 1.5 Application details

Date of reception of test sample: 2<sup>nd</sup> Nov 2011

Date of test: 5<sup>th</sup> Nov 2011 to 25<sup>th</sup> Nov 2011

## 1.6 Reference specification

FCC Part 22H, Part 2 (October 1, 2009 edition)

## 1.7 Information of EUT

### 1.7.1 General information

Name of EUT	CDMA 1X Wireless Phone
FCC ID	Q78-ZTEWP228
Frequency range	Tx:824~849MHz Rx:869~894MHz
Rated output power	24.0dBm
Modulation type	OQPSK
Emission Designator	1M25F9W
Duplex mode	FDD
Duplex spacing	45MHz
Antenna type	Fixed External
Power Supply	Battery or charger
Rated Power Supply Voltage	3.7V
Extreme Temperature	Lowest: -30°C Highest: +50°C
Extreme Voltage	Minimum: 3.4V Maximum: 4.2V
HW Version	fd9A
SW Version	CT_WP228V1.0.0B03

**1.7.2 EUT details**

Name	Model	SN
CDMA 1X Wireless Phone	ZTE WP228	323612034574

**1.7.3 Auxiliary equipment details**

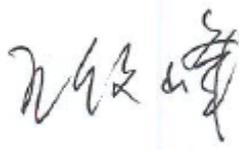
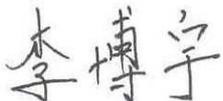
Equipment	Charger
Manufacturer	ZTE
Model Number	STC-A22O50C35
Input Voltage	100V-240V a.c.
Output Voltage	5.0V d.c.
Frequency	50/60Hz

Equipment	Battery
Manufacturer	ZTE
Model Number	Ni3607T30P3S473211
Capacity	700mAh
Rated Voltage	3.6V d.c.

## 2. Test information

### 2.1 Summary of the test results

No.	Test case	FCC reference	Verdict
1	RF Power Output	2.1046	Pass
2	Effective Radiated Power	22.913(a)	Pass
3	Occupied Bandwidth	2.1049	Pass
4	Spurious Emissions at antenna terminals	2.1051/22.917(a)	Pass
5	Band Edges Compliance	2.1051/22.917(a)	Pass
6	Frequency Stability	2.1055/22.355	Pass
7	Radiated Spurious Emissions	2.1053/22.917(a)	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:</p> <p style="text-align: center;"><b>2011.12.12</b></p>

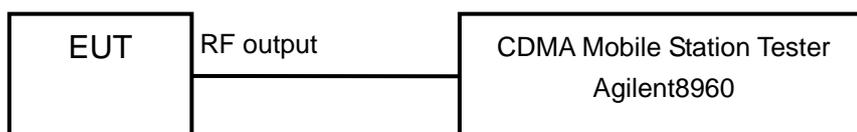
## 2.2 Test result

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

Ambient condition:

Temperature	Relative humidity	Pressure
24°C	53%	101.9kPa

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. Then the test data can be read at the tester screen. The loss between RF output port of the EUT and the input port of the tester will be taken into consideration.

The measurement will be conducted at three channels No1013, No384 and No777 (Bottom, middle and top channels of CDMA 1X band)

Limits	≤30dBm

Test result:

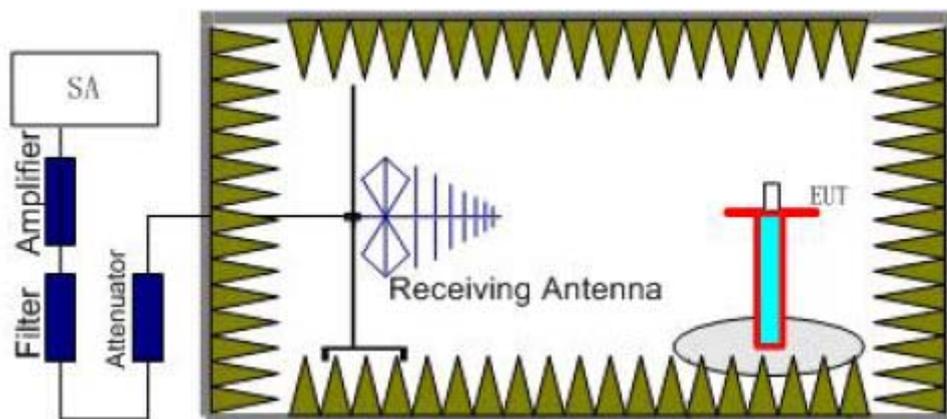
Carrier frequency (MHz)	Channel No.	Test Mode	RF Power Output (dBm)
824.70	1013	RC1/SO2	23.5
		RC1/SO55	23.6
		RC3/SO2	23.6
		<b>RC3/SO55</b>	<b>23.6</b>
836.52	384	RC1/SO2	23.2
		RC1/SO55	23.2
		RC3/SO2	23.3
		<b>RC3/SO55</b>	<b>23.3</b>
848.31	777	RC1/SO2	23.8
		RC1/SO55	23.8
		RC3/SO2	23.8
		<b>RC3/SO55</b>	<b>23.8</b>

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

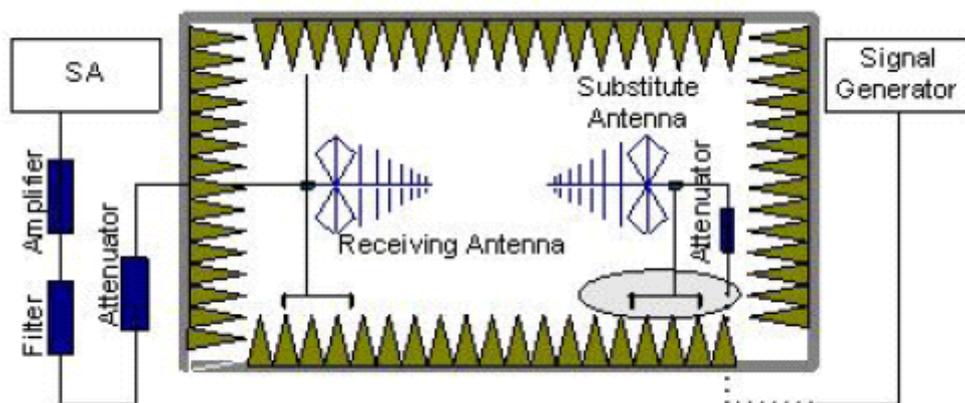
Ambient condition:

Temperature	Relative humidity	Pressure
24°C	53%	101.9kPa

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 No1013, No384 and No777 (Bottom, middle and top channels of CDMA 1X band) in RC3/SO55 test mode.

Limits	≤ 38.5dBm
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**Test result:**

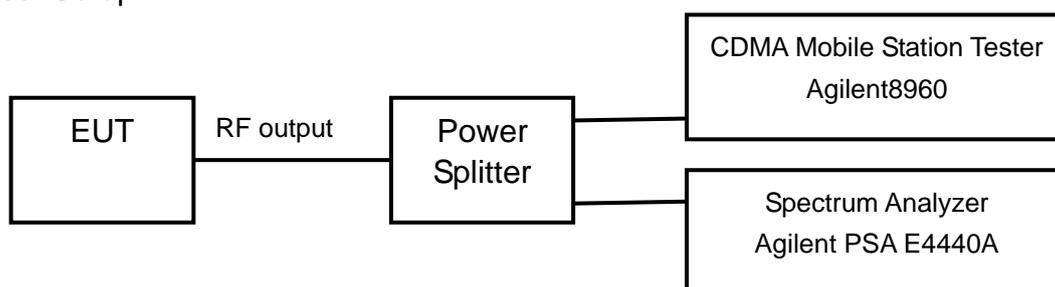
Carrier frequency (MHz)	Channel No.	Test Mode	E.R.P. (dBm)
824.70	1013	RC3/SO55	21.9
836.52	384	RC3/SO55	22.2
848.31	777	RC3/SO55	21.5

### 2.2.3 Occupied Bandwidth-FCC Part2.1049

Ambient condition:

Temperature	Relative humidity	Pressure
24°C	53%	101.9kPa

Test Setup:



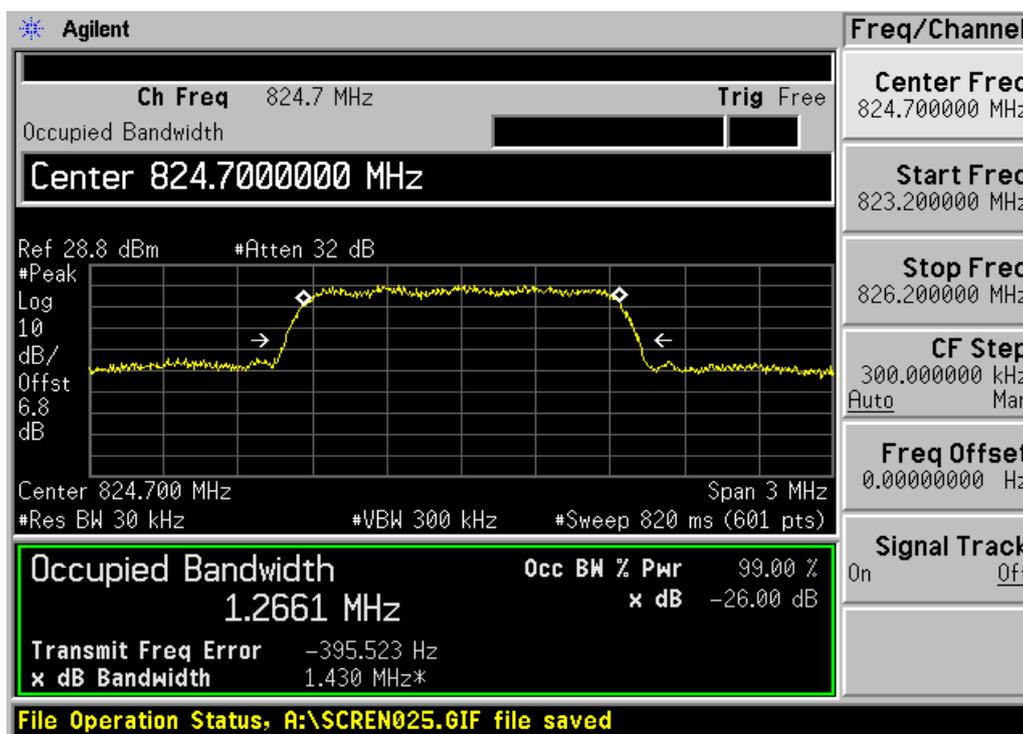
Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The occupied bandwidth is measured using spectrum analyzer. RBW is set to 3kHz on spectrum analyzer. The bandwidth of 99% power can be read on spectrum analyzer. The measurement will be conducted at three channels No1013, No384 and No777 (Bottom, middle and top channels of CDMA 1X band) in RC3/SO55 test mode.

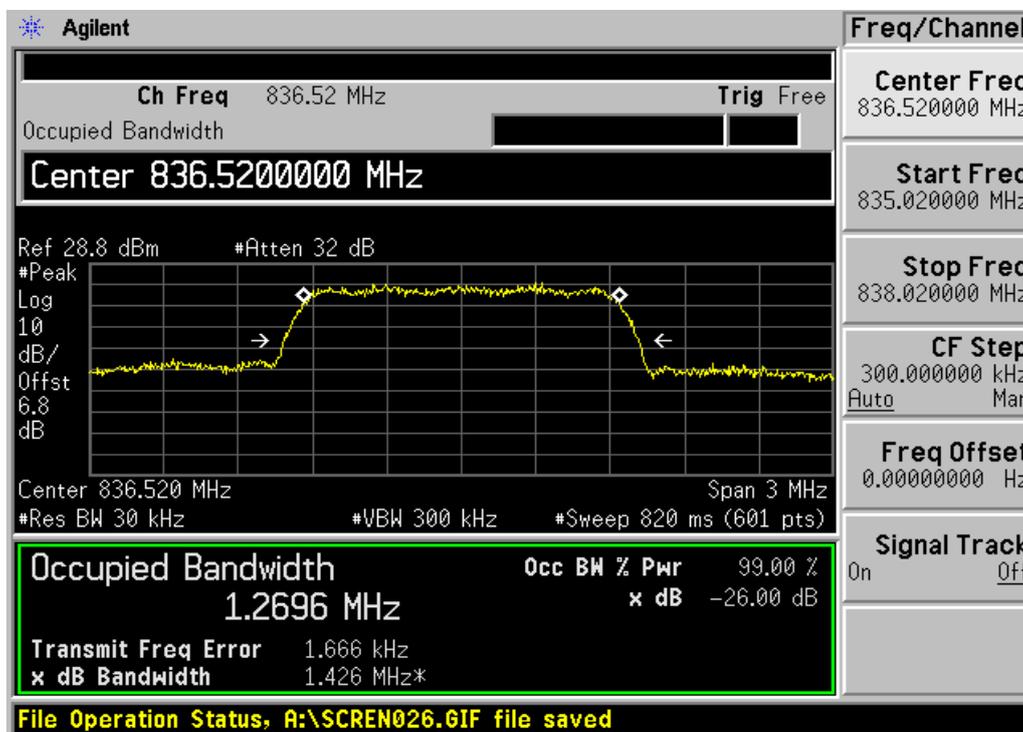
Limits: No specific occupied bandwidth requirements in part 2.1049

Test result:

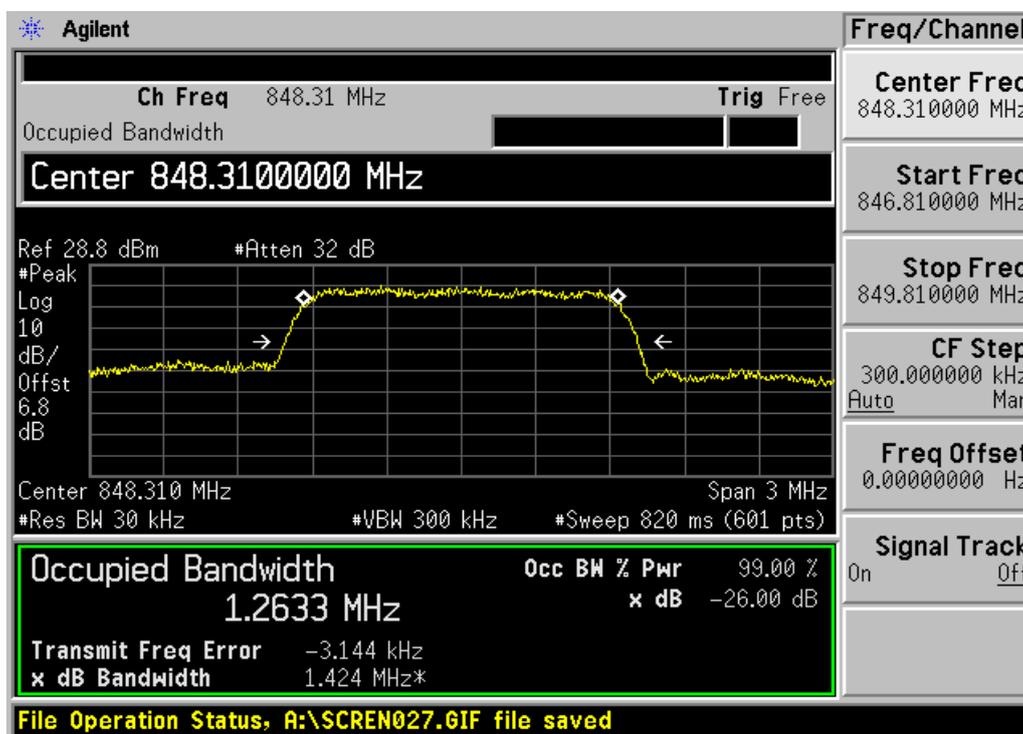
Carrier frequency (MHz)	Channel No.	Test Mode	Bandwidth of 99% Power (MHz)
824.70	1013	RC3/SO55	1.2661
836.52	384	RC3/SO55	1.2696
848.31	777	RC3/SO55	1.2633



Channel 1013



Channel 384



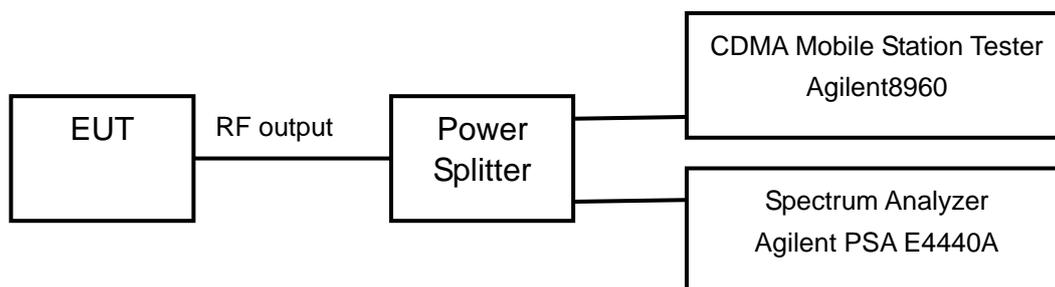
Channel 777

## 2.2.4 Spurious Emissions at antenna terminal-FCC Part2.1051/22.917(a)

Ambient condition:

Temperature	Relative humidity	Pressure
24°C	53%	101.9kPa

Test Setup:



Test procedure:

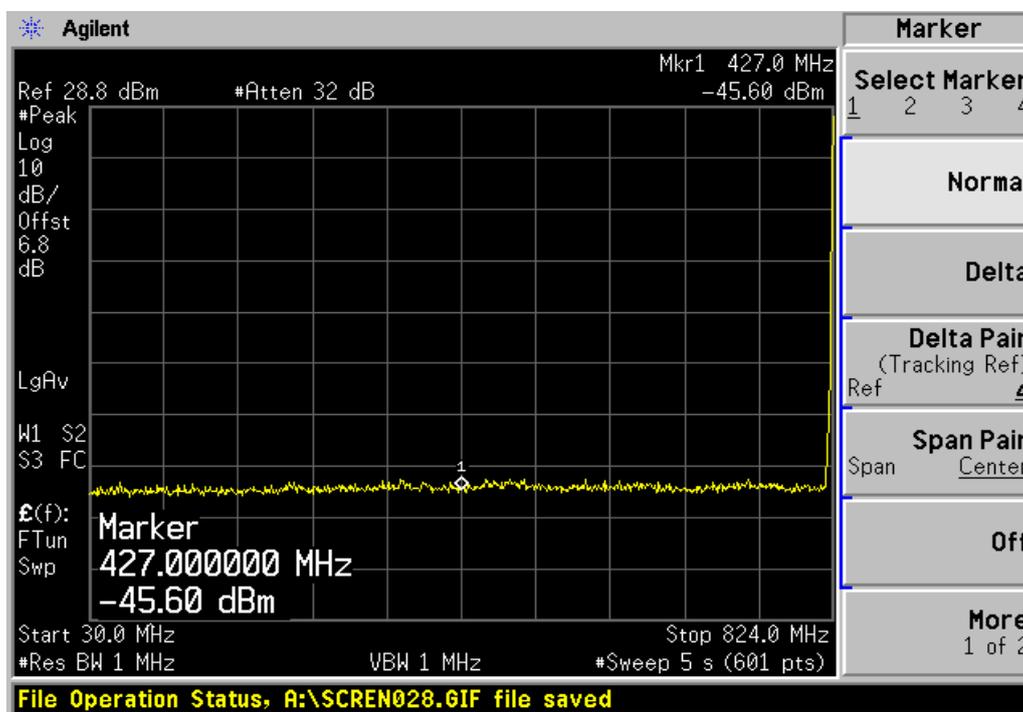
After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to 9GHz (higher than the 10<sup>th</sup> harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer.

The measurement will be conducted at three channels No1013, No384 and No777 (Bottom, middle and top channels of CDMA 1X band) in RC3/SO55 test mode.

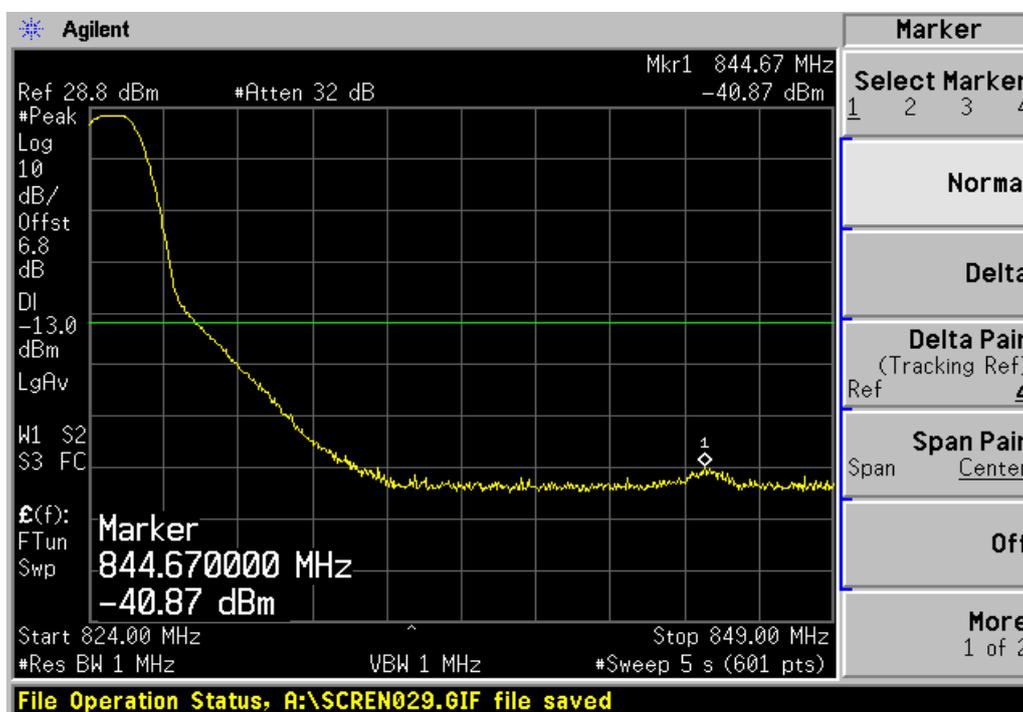
Limits	≤ -13dBm

Test result:

Refer to the following figures.

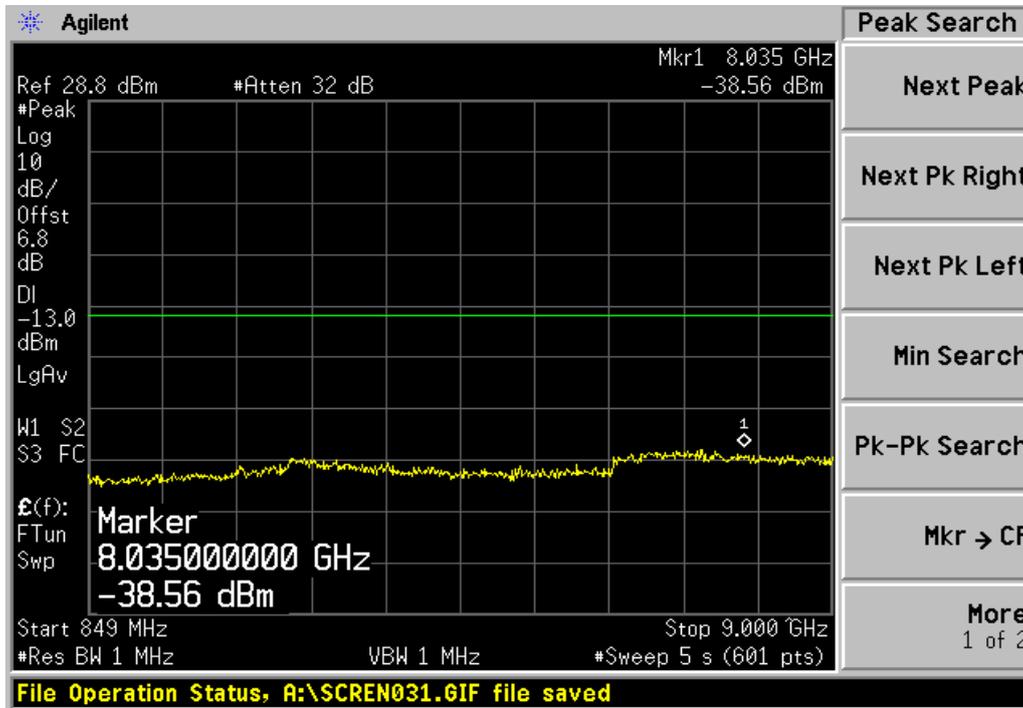


Channel 1013, 30MHz~824MHz

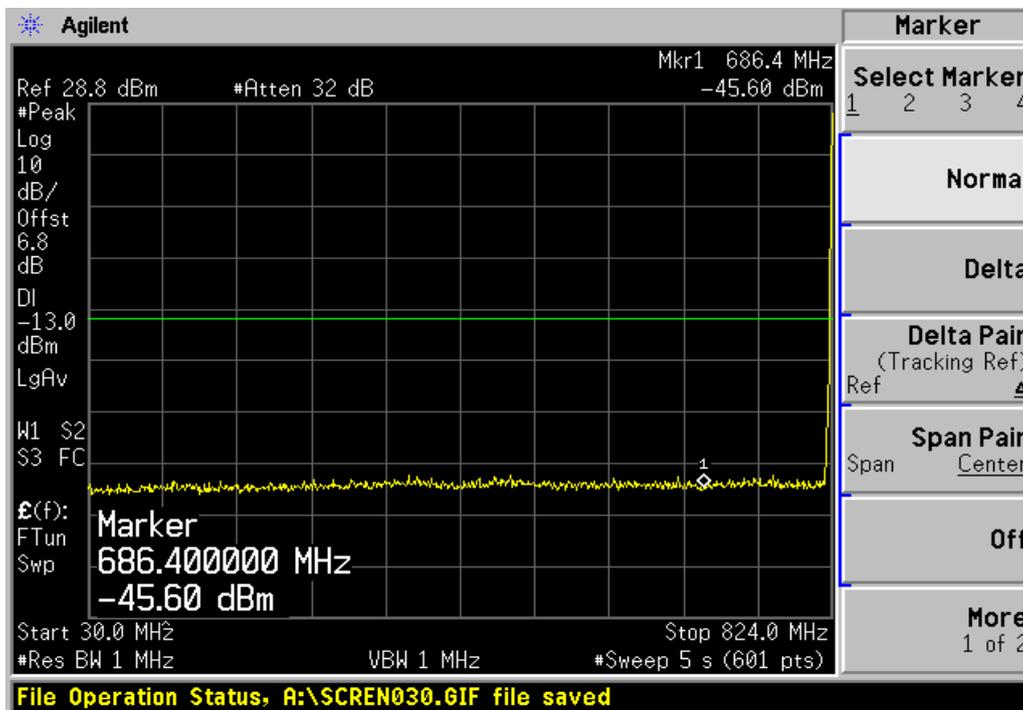


Channel 1013, 824MHz~849MHz

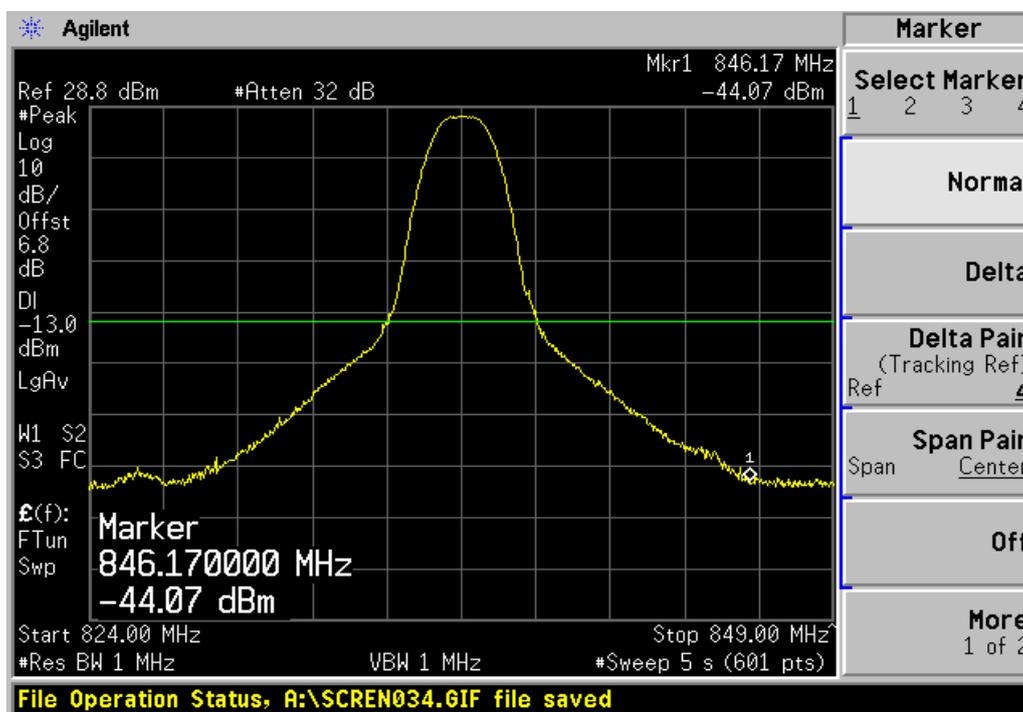
Note: The signal beyond the limit is carrier.



Channel 1013, 849MHz~9GHz

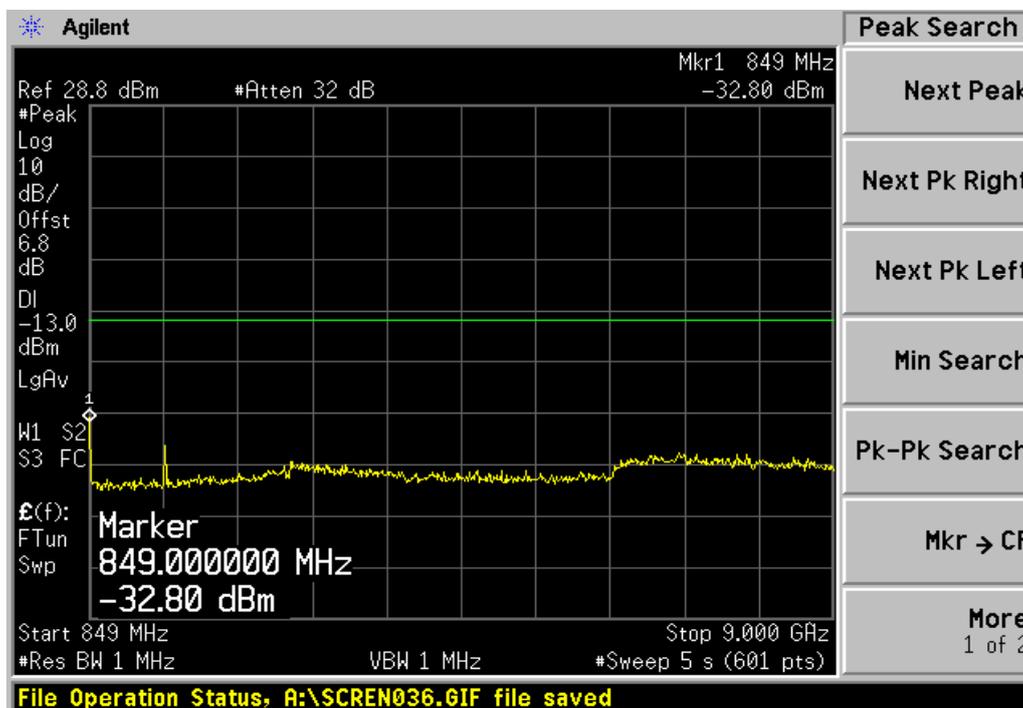


Channel 384, 30MHz~824MHz

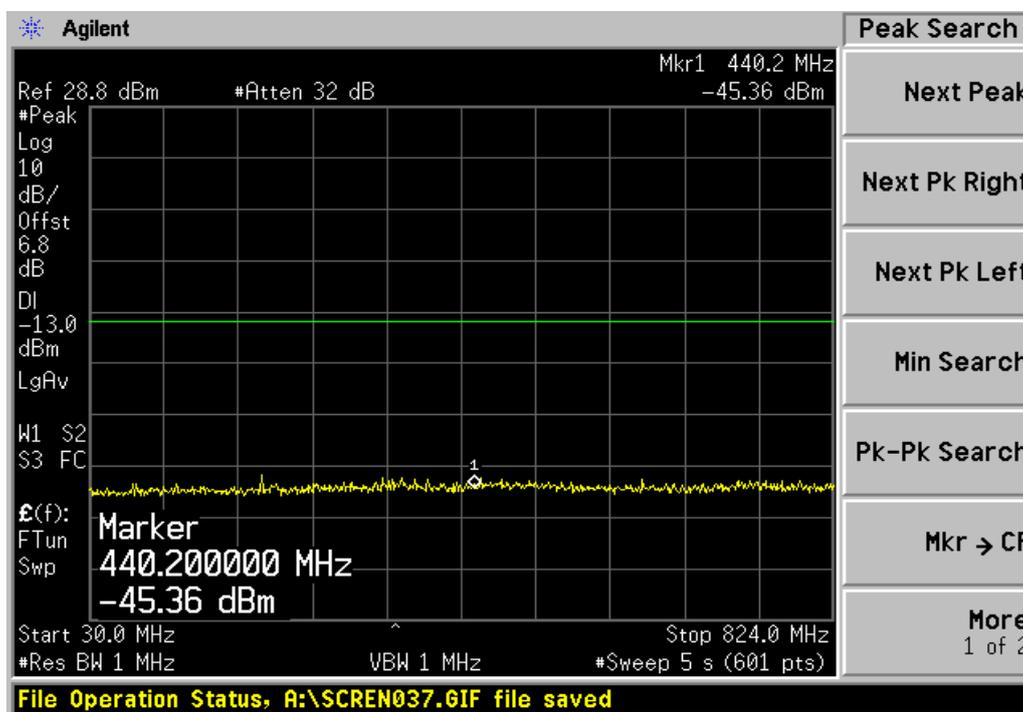


Channel 384, 824MHz~849MHz

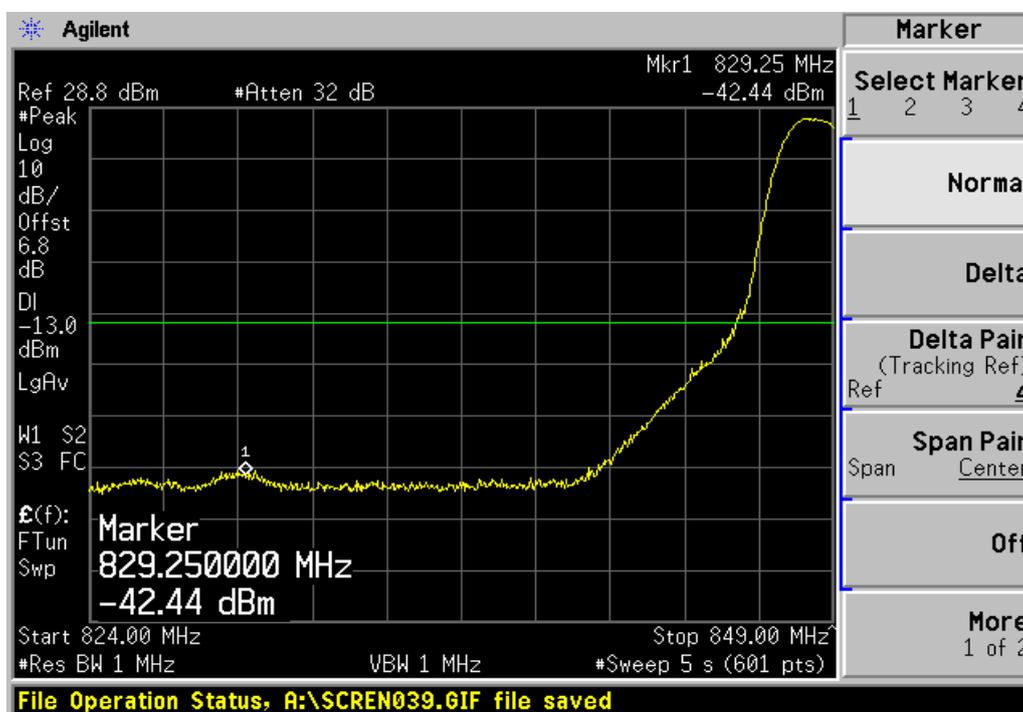
Note: The signal beyond the limit is carrier.



Channel 384, 849MHz~9GHz

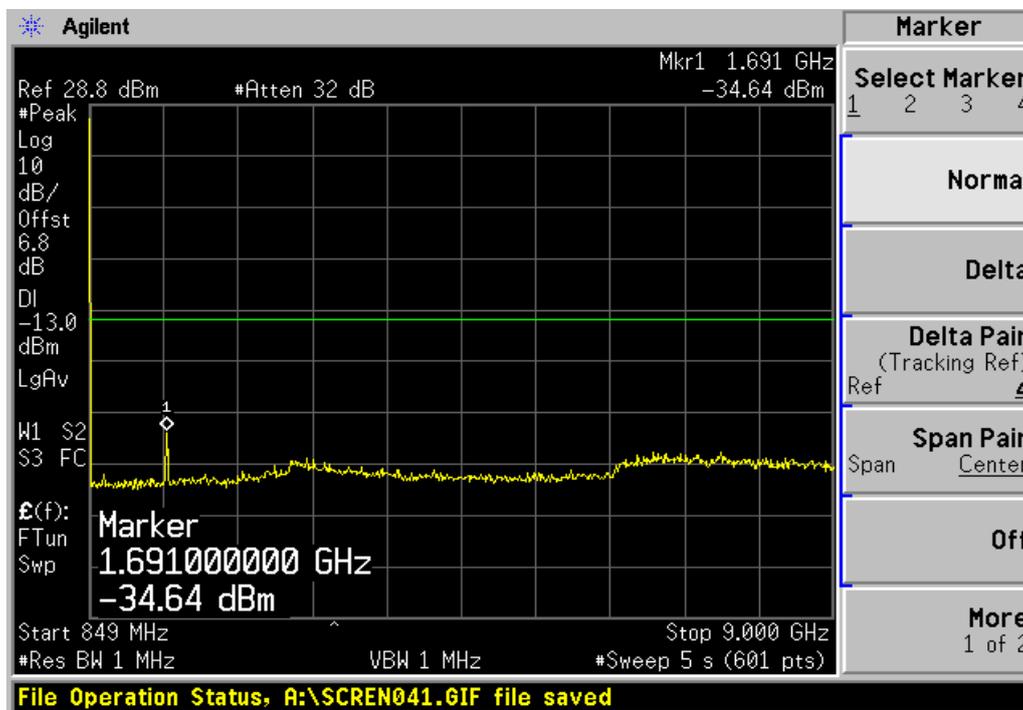


Channel 777, 30MHz~824MHz



Channel 777, 824MHz~849MHz

Note: The signal beyond the limit is carrier.



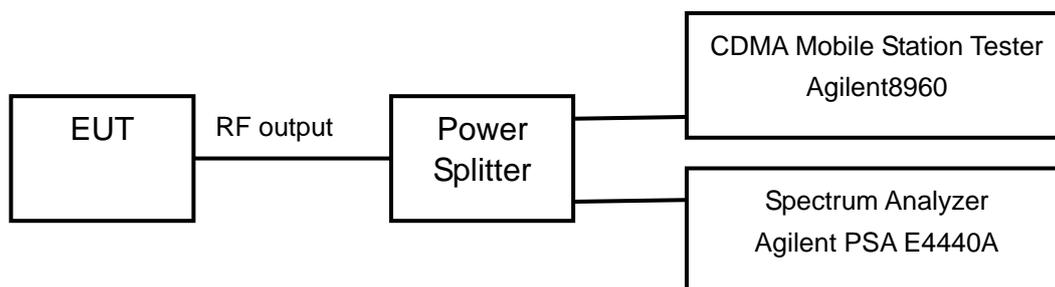
Channel 777, 849MHz~9GHz

## 2.2.5 Band Edges Compliance-FCC Part2.1051/22.917(a)

Ambient condition:

Temperature	Relative humidity	Pressure
24°C	53%	101.9kPa

Test Setup:



Test procedure:

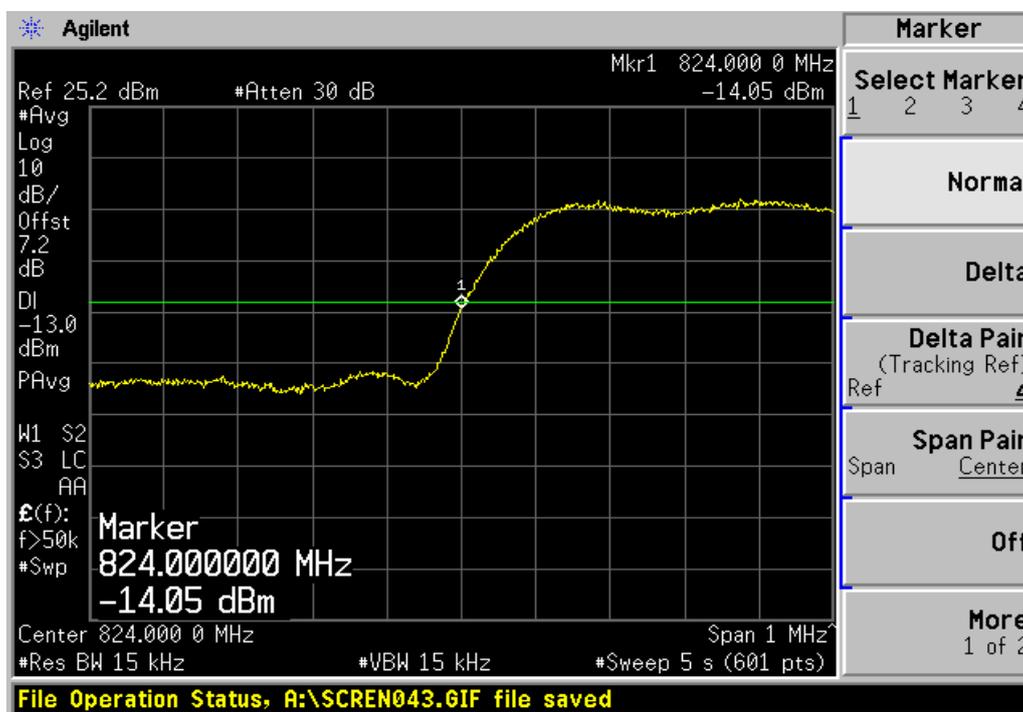
After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The RBW is set to at least 1% of the emission bandwidth on spectrum analyzer.

The measurement will be conducted at two channels No1013 and No777 (Bottom and top channels of CDMA 1X band) in RC3/SO55 test mode.

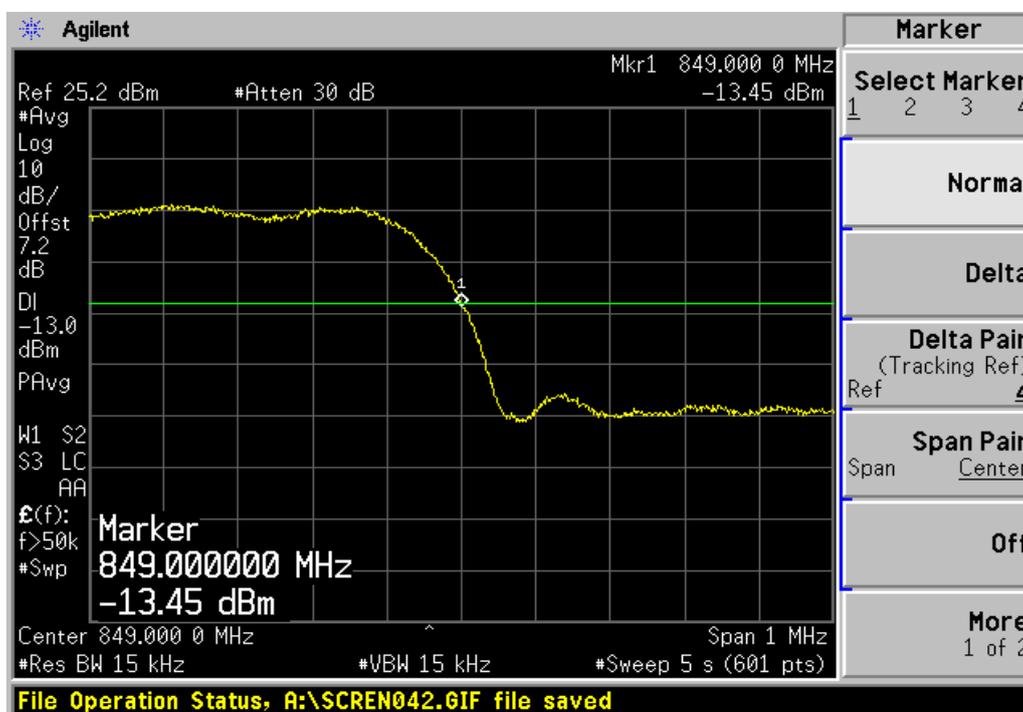
Limits	$\leq -13\text{dBm}$
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Test result:

Refer to the following figures.



Channel 1013



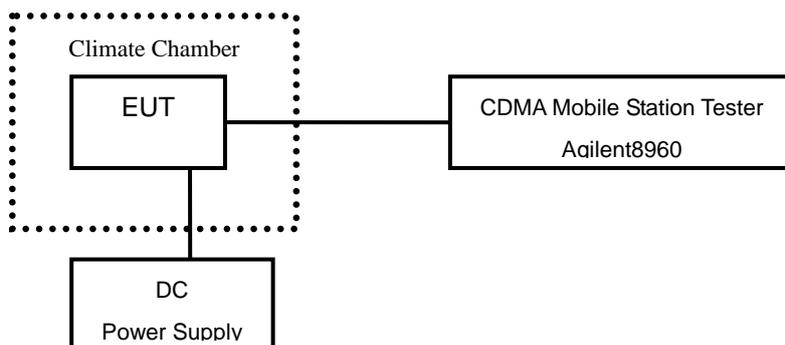
Channel 777

## 2.2.6 Frequency Stability-FCC Part2.1055/22.355

Ambient condition:

Temperature	Relative humidity	Pressure
24°C	53%	101.9kPa

Test setup:



Test Procedure:

A radio link shall be established between EUT and Tester. The tester will sample the transmitter RF output signal and measure its frequency. The temperature inside the climate chamber is varied from -30 to +50° C in 10° C step size, and also the DC power supply voltage to the EUT is varied from 3.4 to 4.2 V. The measurement will be conducted at three channels No1013, No384 and No777 (Bottom, middle and top channels of CDMA 1X band) in RC3/SO55 test mode. Limits: No specific frequency stability requirements in part 2.1055 and part 22.355

Test Result:

Temperature(°C)	Test Result (ppm)@3.7V		
	Channel 1013	Channel 384	Channel 777
-30	0.006	0.004	0.006
-20	0.007	0.008	0.006
-10	0.002	0.003	0.004
0	0.005	0.003	0.004
+10	0.006	0.004	0.007
+20	0.005	0.004	0.005
+30	0.004	0.004	0.006
+40	0.007	0.007	0.008
+50	0.005	0.004	0.004

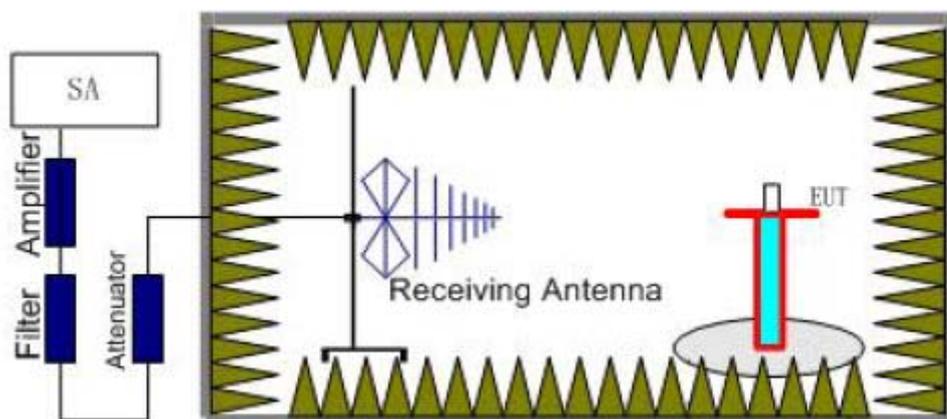
Voltage (V)	Test Result (ppm)@20°C		
	Channel 1013	Channel 384	Channel 777
3.4	0.005	0.006	0.003
4.2	0.004	0.003	0.005

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

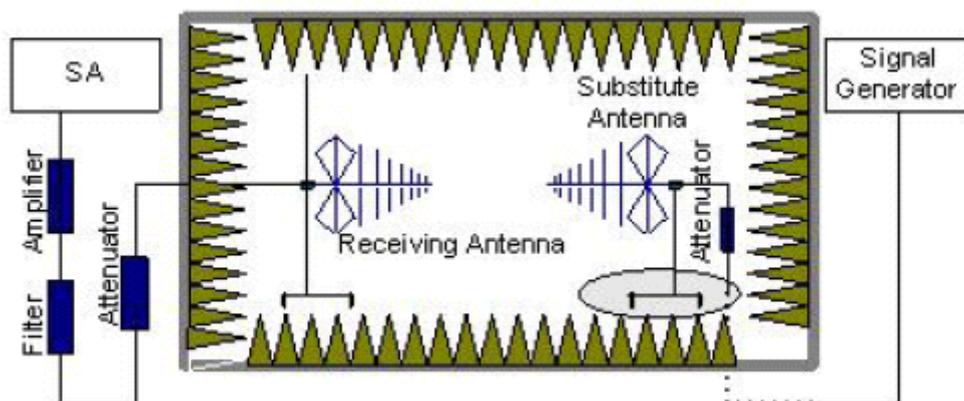
Ambient condition

Temperature	Relative humidity	Pressure
24°C	53%	101.9kPa

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)

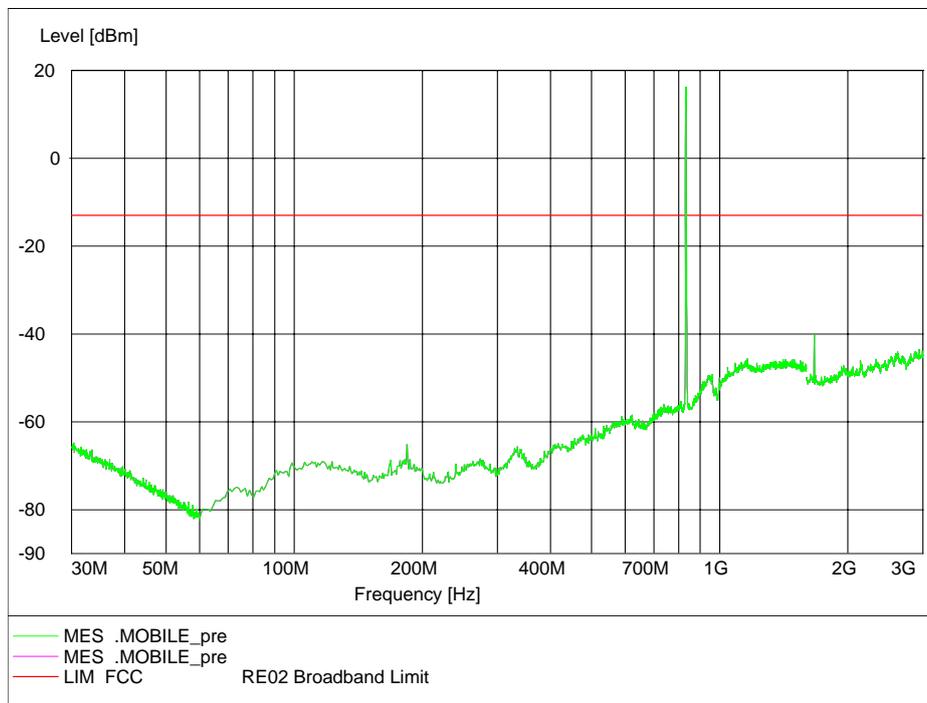
Assumed the reading of the receiver is -60dBm. A cable lose of 10dB, an air lose of 30dB and an antenna gain of 11dBi are added.

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

The measurement will be conducted at one channel No384 (middle channel of CDMA 1X band) in RC3/SO55 test mode.

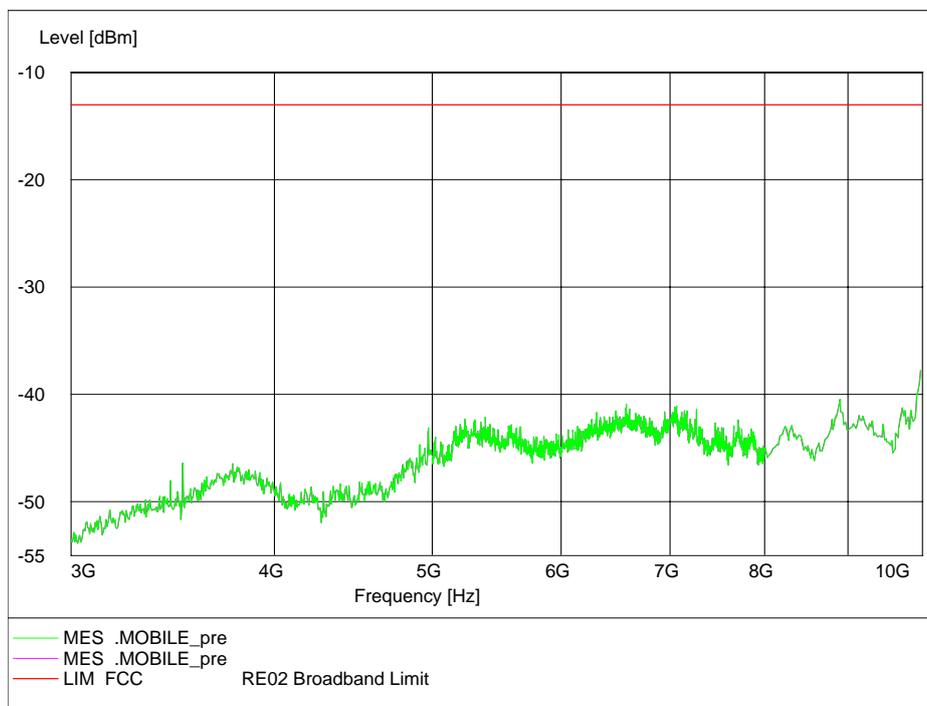
Limits	≤ -13dBm
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Test result:



Channel 384, 30MHz~3GHz

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



Channel 384, 3GHz~10GHz

### 2.3. List of test equipments

No.	Name/Model	Manufacturer	S/N	Calibration Due Date
1	E5515C(8960) Mobile Station Tester	Agilent	GB43194054	19 <sup>th</sup> Aug. 2012
2	PSA E4440A Spectrum Analyzer	Agilent	MY46186900	19 <sup>th</sup> Aug. 2012
3	E3645A DC Power Supply	Agilent	MY40000744	19 <sup>th</sup> Aug. 2012
4	11850C Power Splitter	Agilent	026057	19 <sup>th</sup> Aug. 2012
5	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	19 <sup>th</sup> Aug. 2012
6	ESI 40 EMI test receiver	R&S	100015	19 <sup>th</sup> Aug. 2012
7	SMR 20 Signal generator	R&S	100086	19 <sup>th</sup> Aug. 2012
8	CMU 200 Radio tester	R&S	100313	19 <sup>th</sup> Aug. 2012
9	12.65m*8.03m*7.50m Fully-Anechoic Chamber	FRANKONIA	-----	19 <sup>th</sup> Aug. 2012
10	HL562 Ultra log test antenna	R&S	100016	19 <sup>th</sup> Aug. 2012
11	23.18m×16.88m×9.60m Semi-Anechoic Chamber	FRANKONIA	-----	19 <sup>th</sup> Aug. 2012
12	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100030	19 <sup>th</sup> Aug. 2012
13	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100029	19 <sup>th</sup> Aug. 2012
14	PS2000 Turn Table	FRANKONIA	-----	19 <sup>th</sup> Aug. 2012
15	MA260 Antenna Master	FRANKONIA	-----	19 <sup>th</sup> Aug. 2012
16	SH-241 Climatic Chamber	ESPEC	92000389	19 <sup>th</sup> Aug. 2012
17	ES-K1 EMI test software	R&S	-----	19 <sup>th</sup> Aug. 2012
18	HL562 Receive antenna	R&S	100167	19 <sup>th</sup> Aug. 2012

## Appendix

### Appendix1 Test Setup