
TEST REPORT

Report No.: SRMC2008-H024-E0050

Product Name: CDMA 1X Digital Mobile Phone

Product Model: RM-388

Applicant: Nokia Inc.

Manufacturer: BYD Company Limited

Specification: FCC Part22H, Part 2

FCC ID: QMNRM-388

The State Radio Monitoring Center, Equipment Testing Division

The State Radio Spectrum Monitoring and Testing Center

No.80 Beilishi Road Xicheng District Beijing, China

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

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1. General information

1.1 Notes of the test report

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

1.2 Information about the testing laboratory

Company: The State Radio Monitoring Center, Equipment Testing Division
The 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: Nokia Inc.
Address: 12278 Scripps Summit Drive 92131
City: San Diego, CA
Country or Region: USA
Grantee Code: QMN
Contacted person: Mary Washington
Tel: +1 858 831 5000
Fax: +1 858 831 6500
Email: mary.washington@Nokia.com

1.4 Manufacturer's details

Company: BYD Company Limited
Address: No.1 Yan an Road, Kuichong, Longgang, 518119
City: Shenzhen
Country or Region: P. R. China
Contacted person: Konger Kong
Tel: +86-021-61009669-2102
Fax: +86-021-61009668
Email: konger.kong@byd.com

1.5 Application details

Date of reception of test sample: 23th June 2008

Date of test: 23th June 2008 to 27th June 2008

1.6 Reference specification

FCC Part22H, Part 2

1.7 Information of EUT

1.7.1 General information

Name of EUT	CDMA 1X Digital Mobile Phone
FCC ID	QMNRM-388
Frequency range	Tx:824~849MHz Rx:869~894MHz
Rated output power	24.0dBm
E.R.P.	24.75dBm
Modulation type	OQPSK
Emission Designator	1M25F9W
Duplex mode	FDD
Duplex spacing:	45MHz
Antenna type	Fixed Internal
Power Supply	Battery or charger
Rated Power Supply Voltage	3.7V
Extreme Temperature	Lowest: -30°C Highest: +50°C
Extreme Voltage	Minimum: 3.1V Maximum: 4.2V
HW Version	3000
SW Version	DN_1300B_0509_R800-FCC_R80

1.7.2 EUT details

Name	Model	Serial number
CDMA 1X Digital Mobile Phone	RM-388	MEID A0000001268E23

1.7.3 Auxiliary equipment details

Equipment	Charger
Manufacturer	Nokia Inc.
Model Number	AC-6U

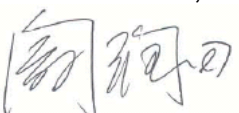
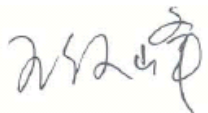
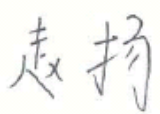
Equipment	Battery
Manufacturer	Nokia Inc.
Model Number	BL-4C
Capacity	860 mAh
Rated Voltage	3.7V

Equipment	Headset
Manufacturer	Nokia Inc.
Model Number	HS-9

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

This Test Report Is Issued by: Mr. Kan Runtian, Director of the test lab 	Checked by: 
Tested by: 	Issued date: 2 nd July 2008

Test report revision:

Revision	Report No.	Issue Date
0	SRMC2008-H024-E0036	27 th June 2008
1	SRMC2008-H024-E0050	2 nd July 2008

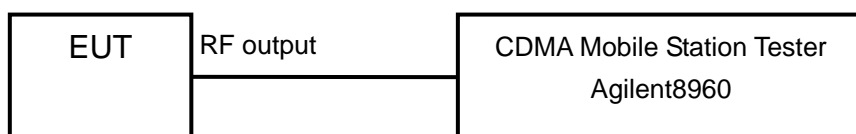
2.2 Test result

2.2.1 RF Power Output –FCC Part2.1046

Ambient condition:

Temperature	Relative humidity	Pressure
18°C	40%	102.5kPa

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 No.1013, No.384 and No.777 (Bottom, middle and top channel of CDMA 1X band)

Limits	$\leq 30\text{dBm}$
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Test result:

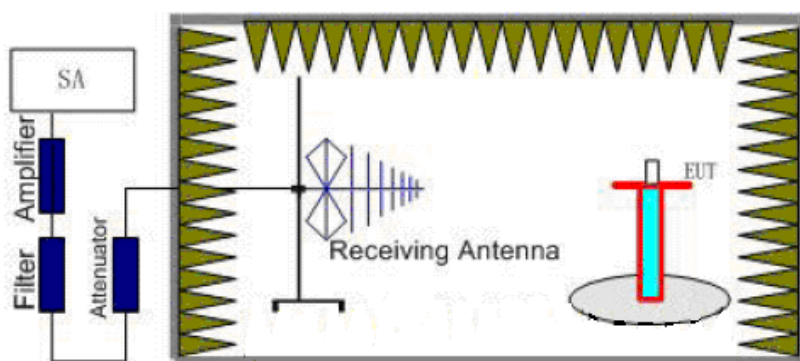
Carrier frequency (MHz)	Channel No.	Test Mode	RF Power Output (dBm)
824.70	1013	RC1/SO2	24.2
		RC1/SO55	24.2
		RC3/SO2	24.2
		RC3/SO55	24.2
836.52	384	RC1/SO2	24.0
		RC1/SO55	24.1
		RC3/SO2	24.0
		RC3/SO55	24.1
848.31	777	RC1/SO2	24.2
		RC1/SO55	24.2
		RC3/SO2	24.2
		RC3/SO55	24.2

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

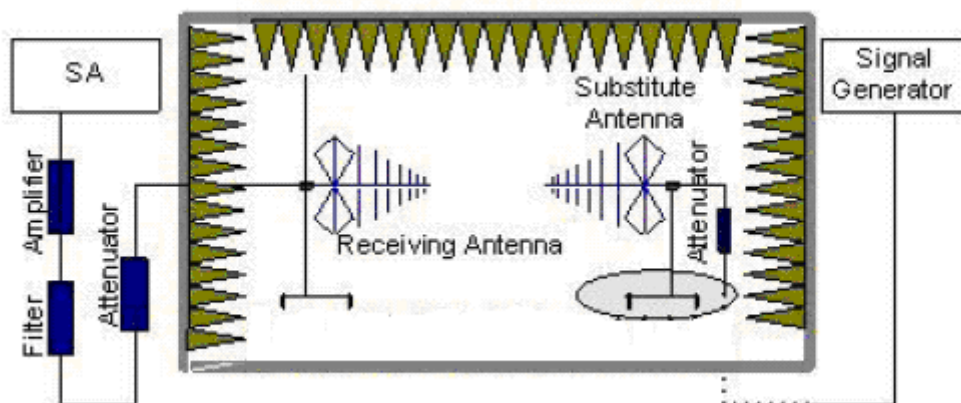
Ambient condition:

Temperature	Relative humidity	Pressure
18°C	40%	102.5kPa

Test setup



Step 1



Step 2

Test procedure:

The measurement was done according to TIA/EIA 603C.

Step 1:

The measurement is carried out in the semi-anechoic chamber. EUT was placed on a 0.8 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. 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 while RBW and VBW are both set to 3MHz. During the measurement, the highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna moved up and down over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.

Step 2:

A dipole antenna shall be substituted in place of the EUT. The antenna will be driven by a signal generator with a known power S.G. applied through a Tx cable. Then the maximum Analyzer reading is recorded while the antenna was moving up and down. The E.R.P. /E.I.R.P. 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 correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading - 2.15. Then the EUT's E.R.P. was calculated with the correction factor, E.R.P. = LVL + Correction factor.

The measurement will be conducted at three channels No.1013, No.384 and No.777 (Bottom, middle and top channels of CDMA 1X band) in RC3/SO55 test mode.

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

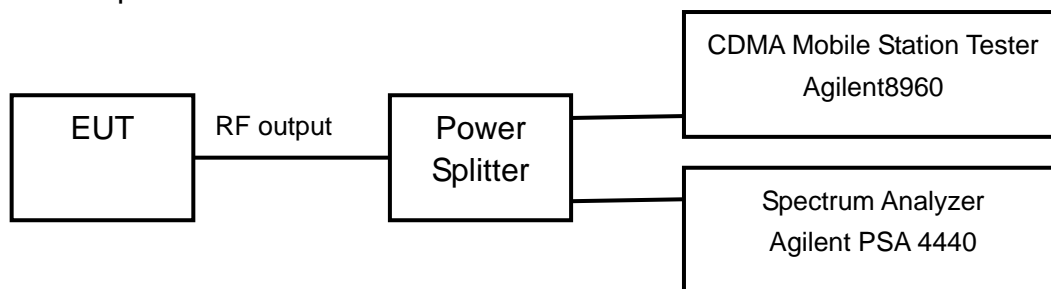
Channel	Frequency (MHz)	LVL (EUT)	S.G.	Gain (dBi)	Gain (dBd)	Cable Loss	LVL (dBm)	Correction Factor (dBm)	ERP (dBm)	ERP (W)
1013	824.70	-6.53	0	-0.72	-2.87	1.0	-35.15	31.28	24.75	0.30
384	836.52	-7.31	0	-0.72	-2.87	1.0	-35.38	31.51	24.20	0.26
777	848.31	-7.05	0	-0.72	-2.87	1.0	-35.65	31.78	24.73	0.30

2.2.3 Occupied Bandwidth-FCC Part2.1049

Ambient condition:

Temperature	Relative humidity	Pressure
18°C	40%	102.5kPa

Test Setup:



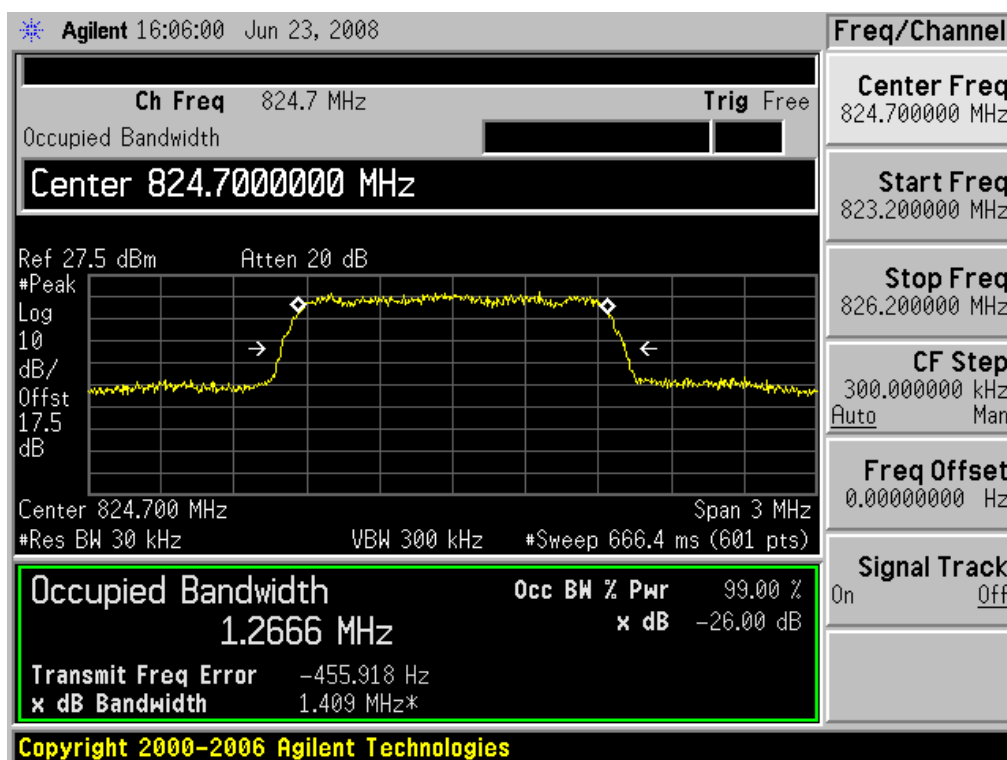
Test procedure:

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 No.1013, No.384 and No.777 (Bottom, middle and top channels of CDMA 1X band) in RC3/SO55 test mode.

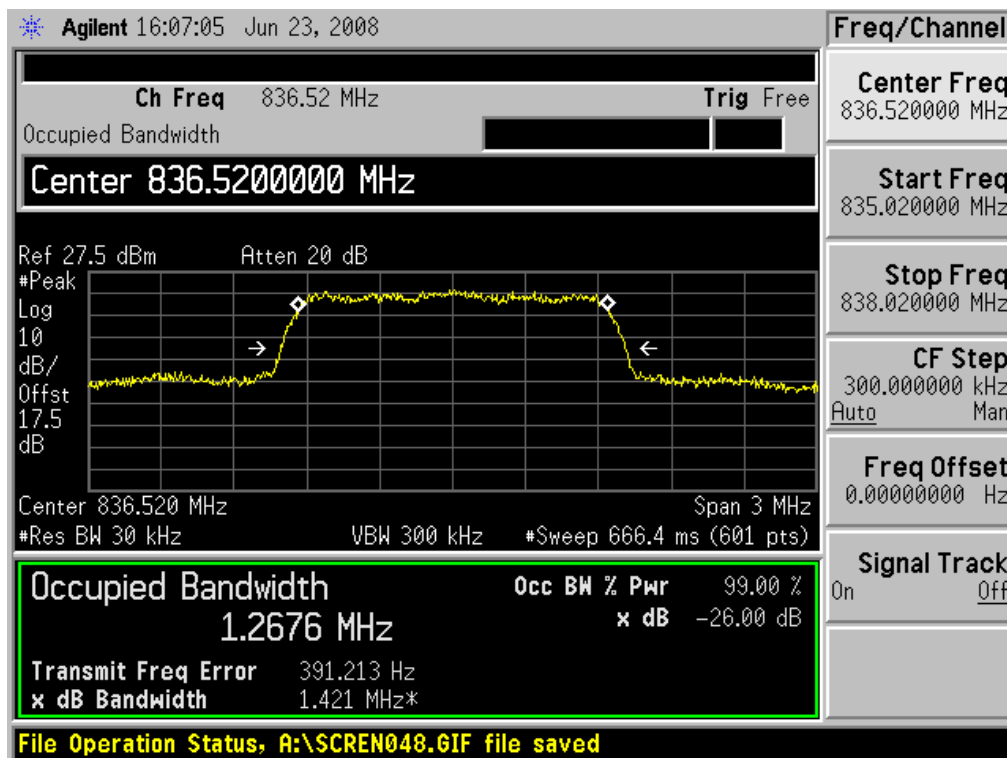
Limits: No specific occupied bandwidth requirements in part 2.1049

Test result:

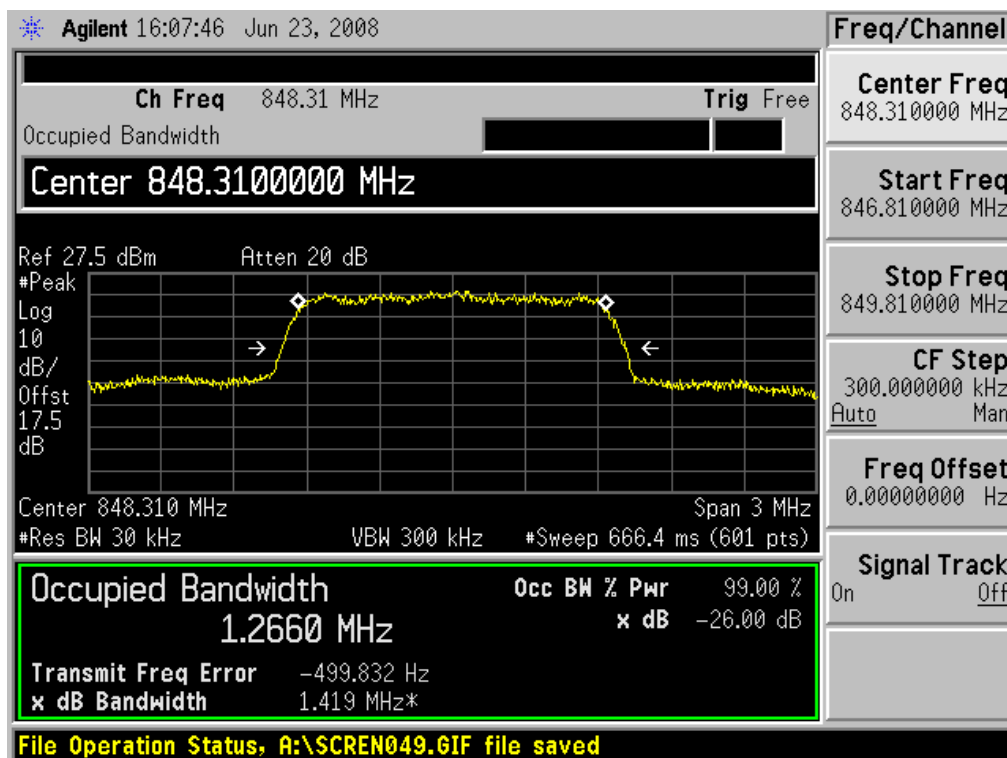
Carrier frequency (MHz)	Channel No.	Test Mode	Bandwidth of 99% Power (MHz)
824.70	1013	RC3/SO55	1.2666
836.52	384	RC3/SO55	1.2676
848.31	777	RC3/SO55	1.2660



Channel 1013



Channel 384



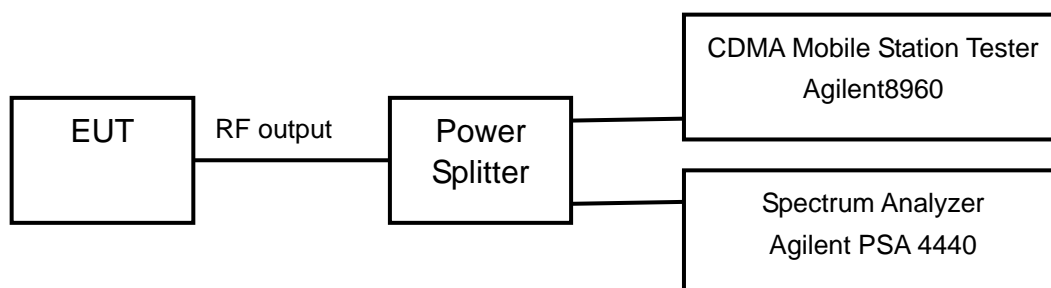
Channel 777

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

Ambient condition:

Temperature	Relative humidity	Pressure
18°C	40%	102.5kPa

Test Setup:



Test procedure:

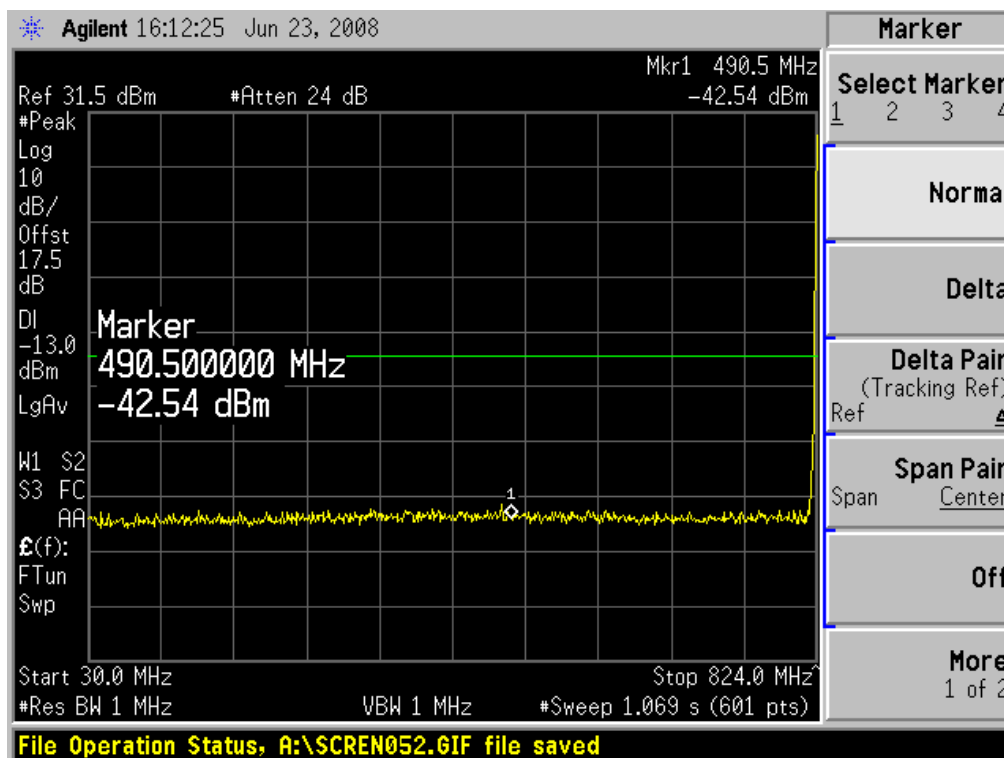
After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to 9GHz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

The measurement will be conducted at three channels No.1013, No.384 and No.777 (Bottom, middle and top channels of CDMA 1X band) in RC3/SO55 test mode.

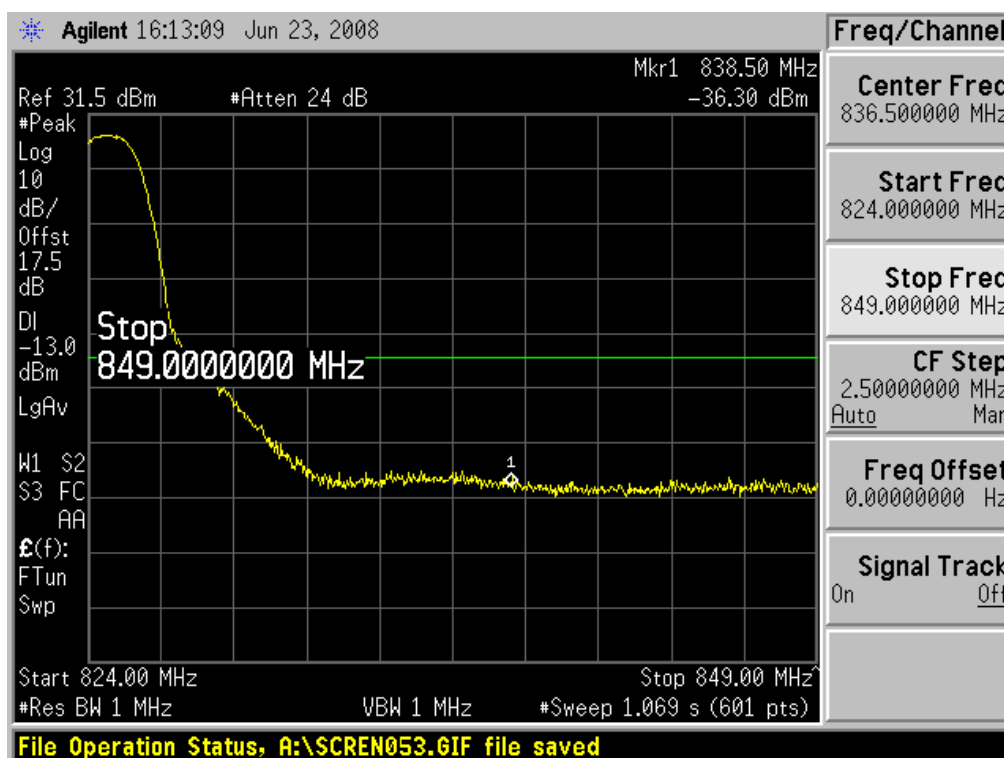
Limits	≤ -13dBm
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Test result:

Refer to the following figures.

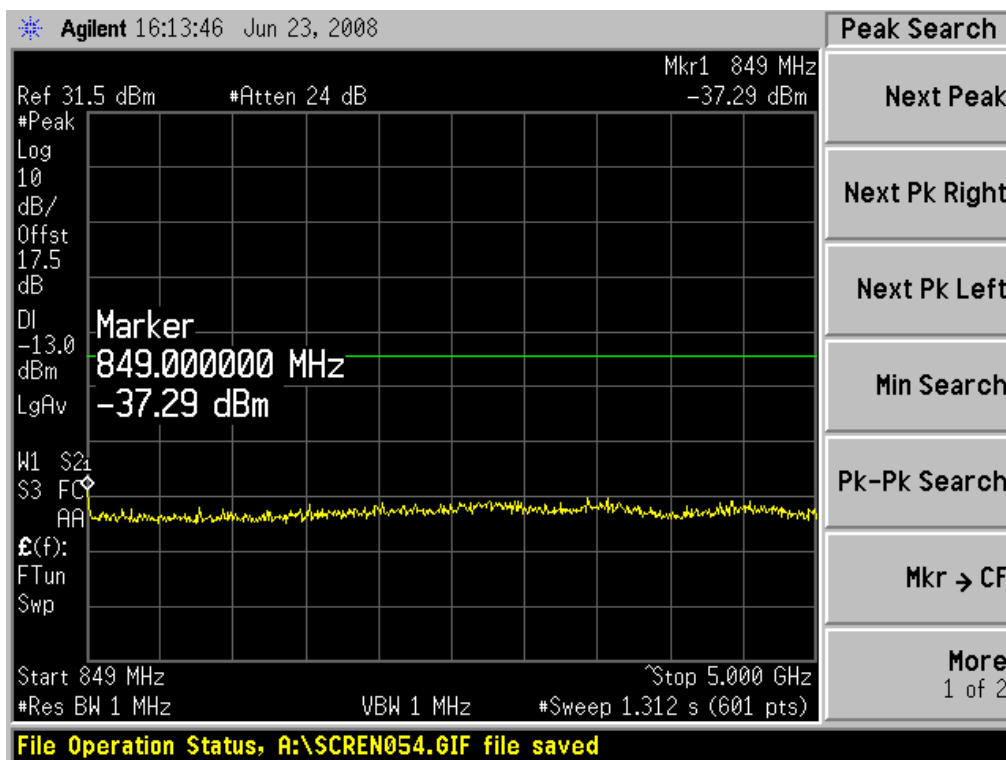


Channel 1013, 30MHz~824MHz

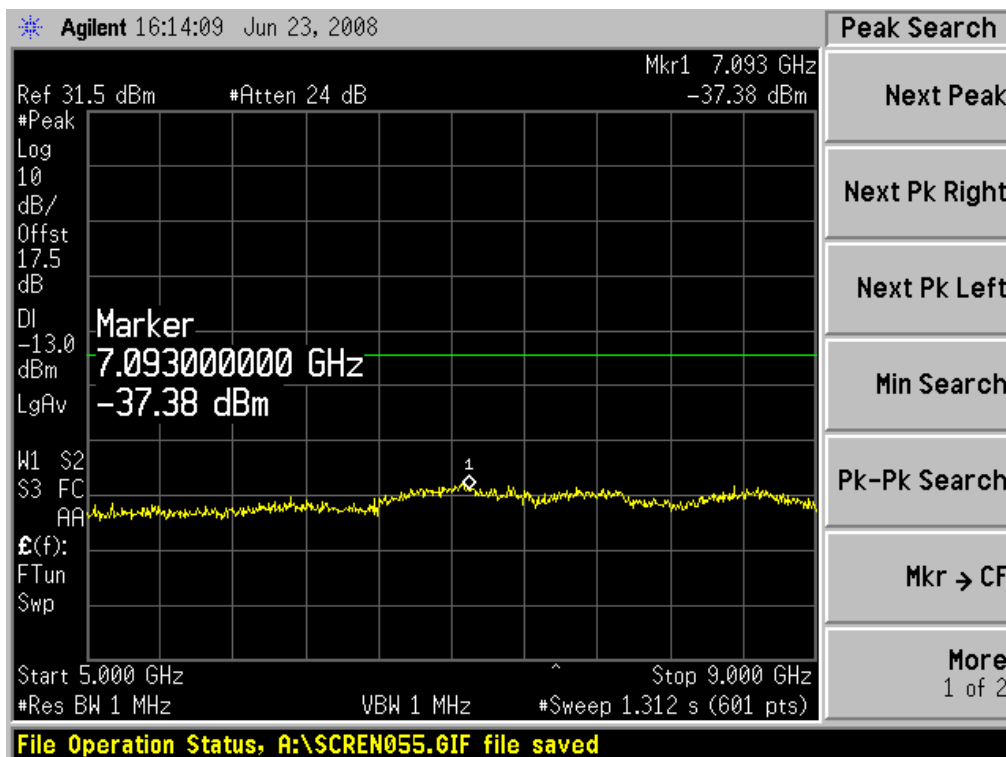


Channel 1013, 824MHz~849MHz

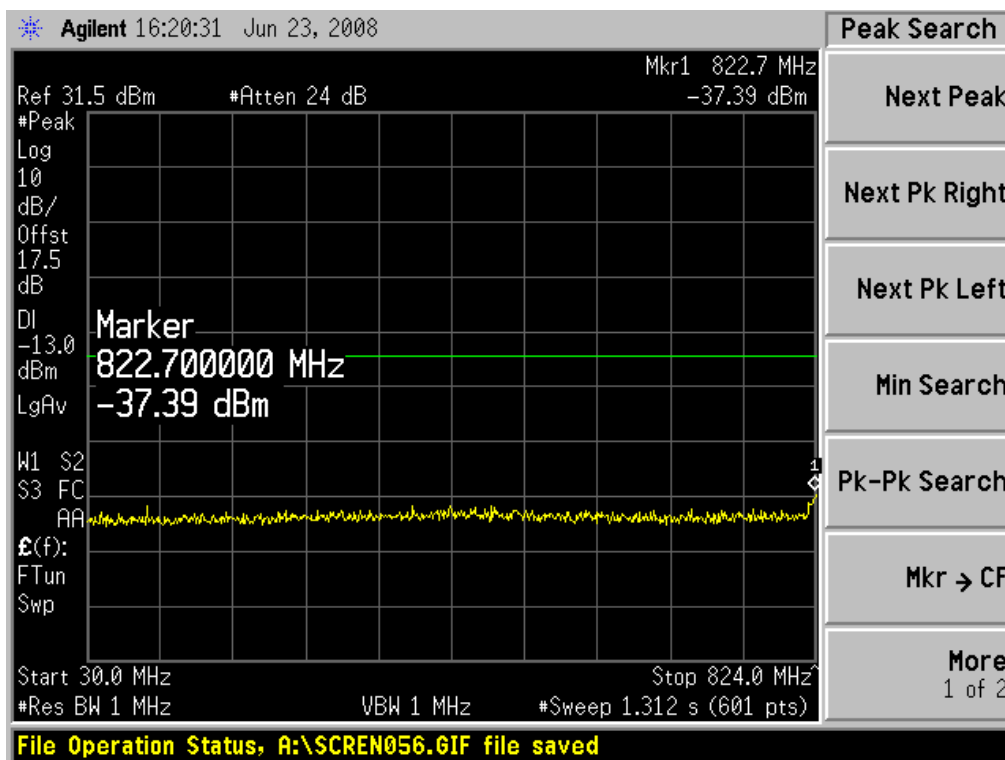
Note: The signal beyond the limit is carrier.



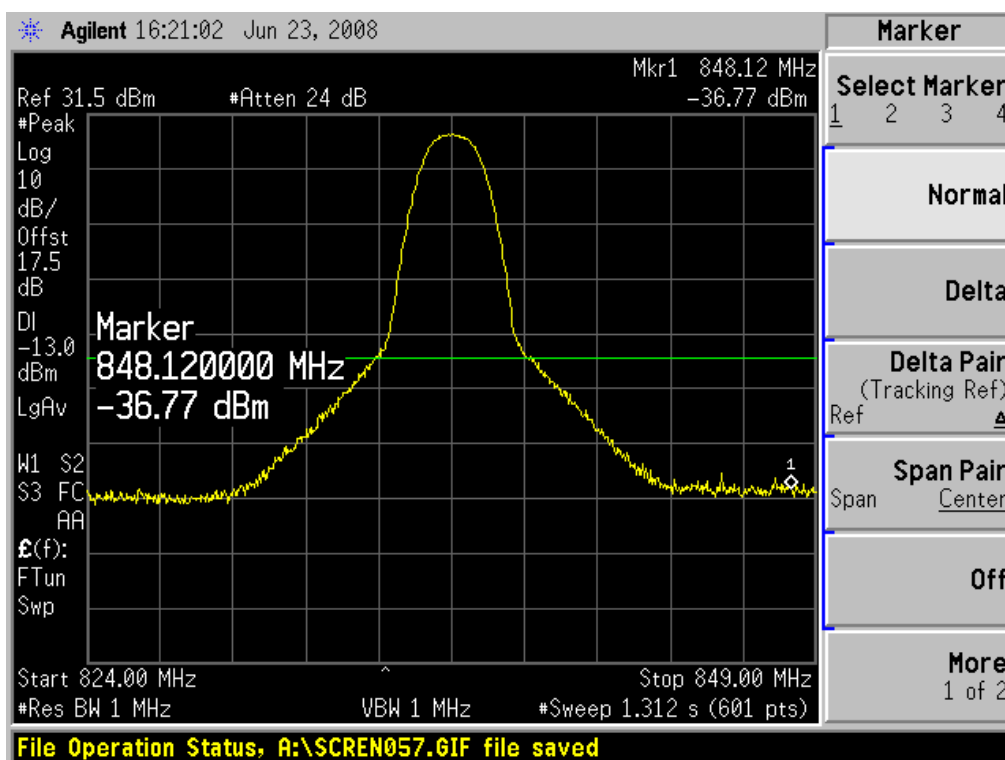
Channel 1013, 849MHz~5GHz



Channel 1013, 5GHz~9GHz

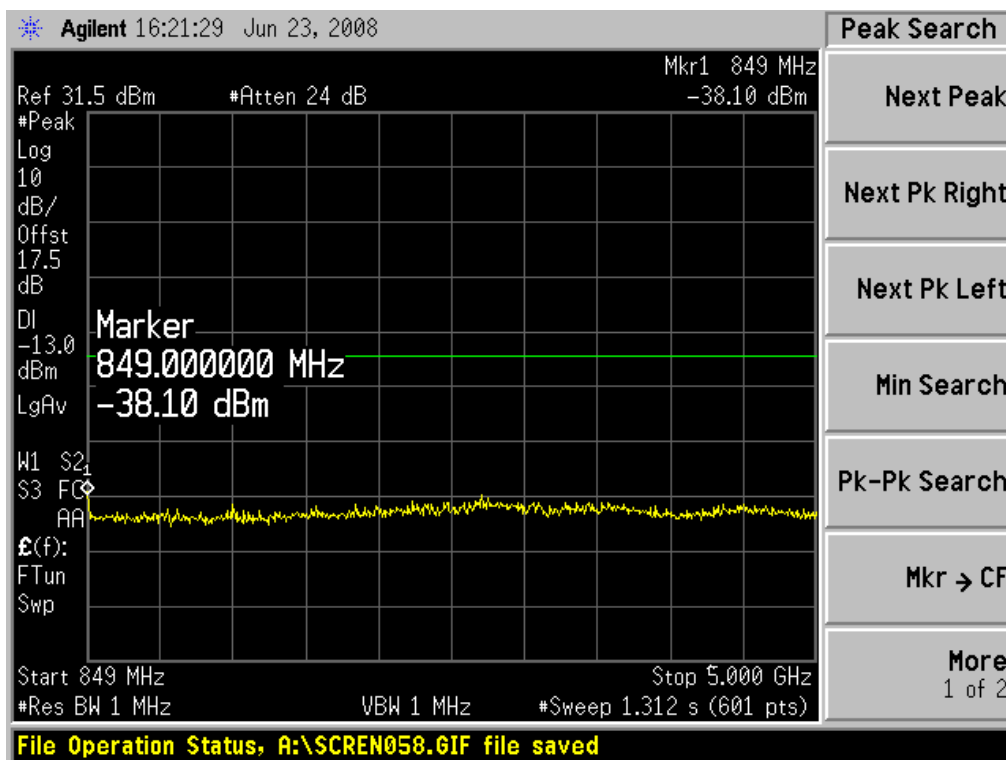


Channel 384, 30MHz~824MHz

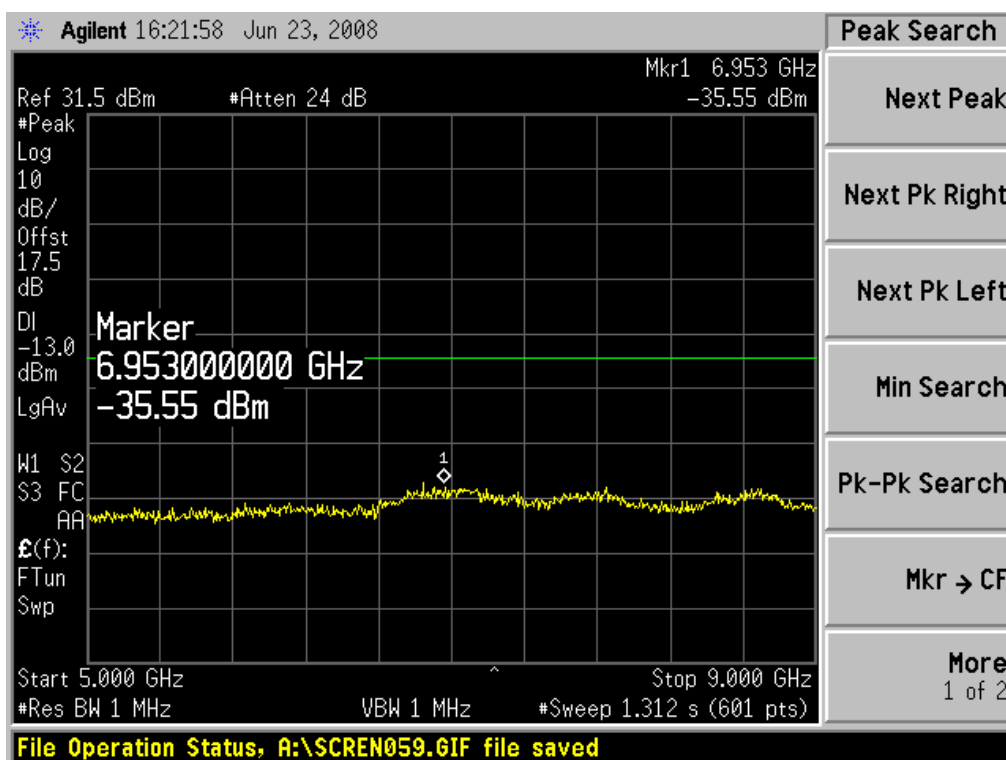


Channel 384, 824MHz~849MHz

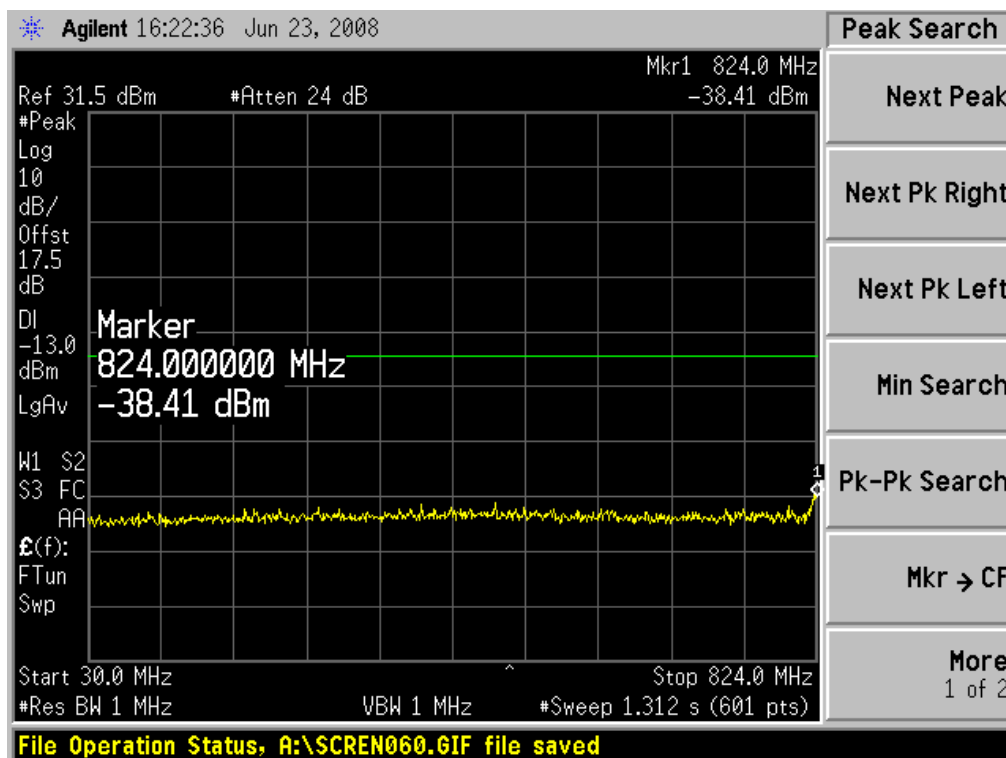
Note: The signal beyond the limit is carrier.



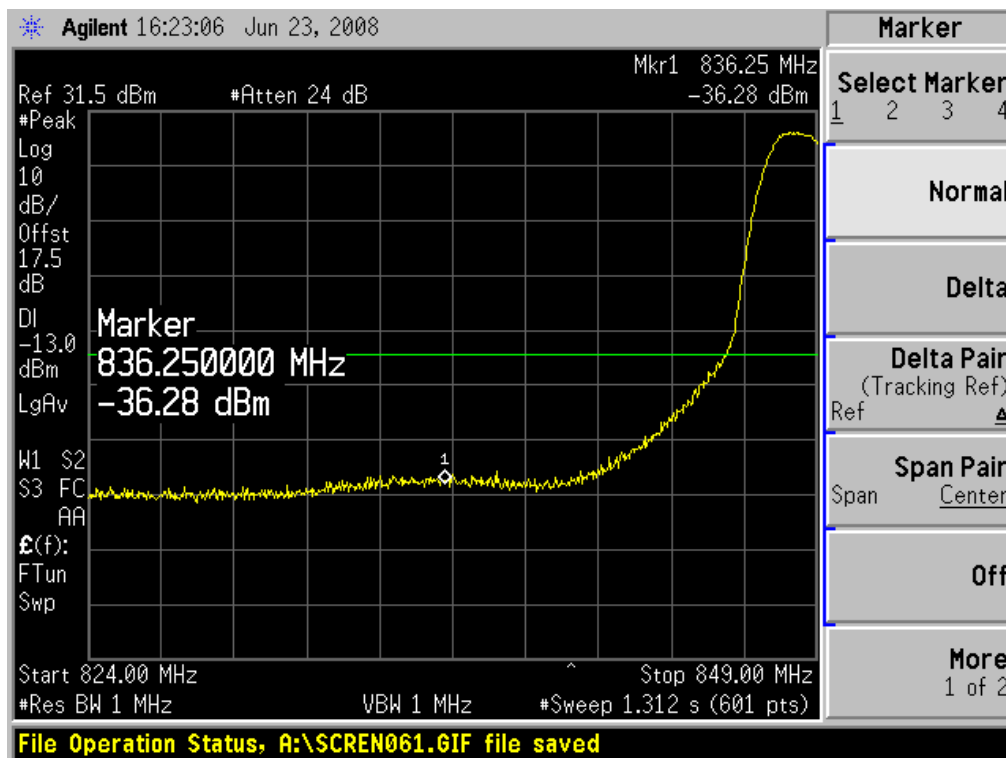
Channel 384, 849MHz~5GHz



Channel 384, 5GHz~9GHz

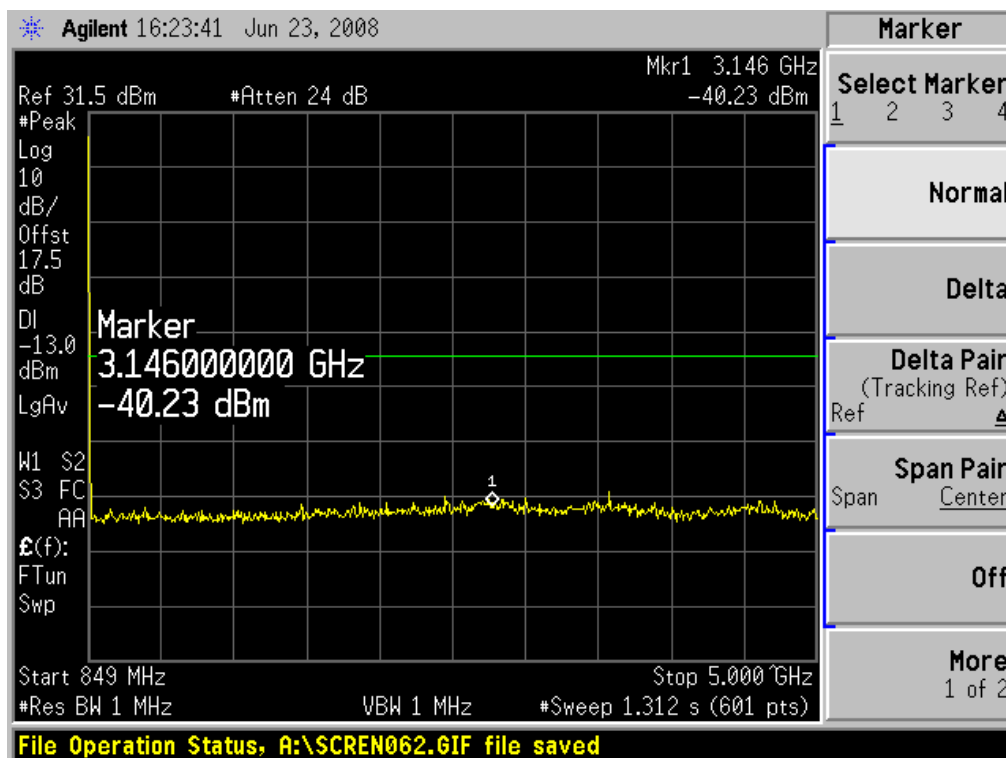


Channel 777, 30MHz~824MHz

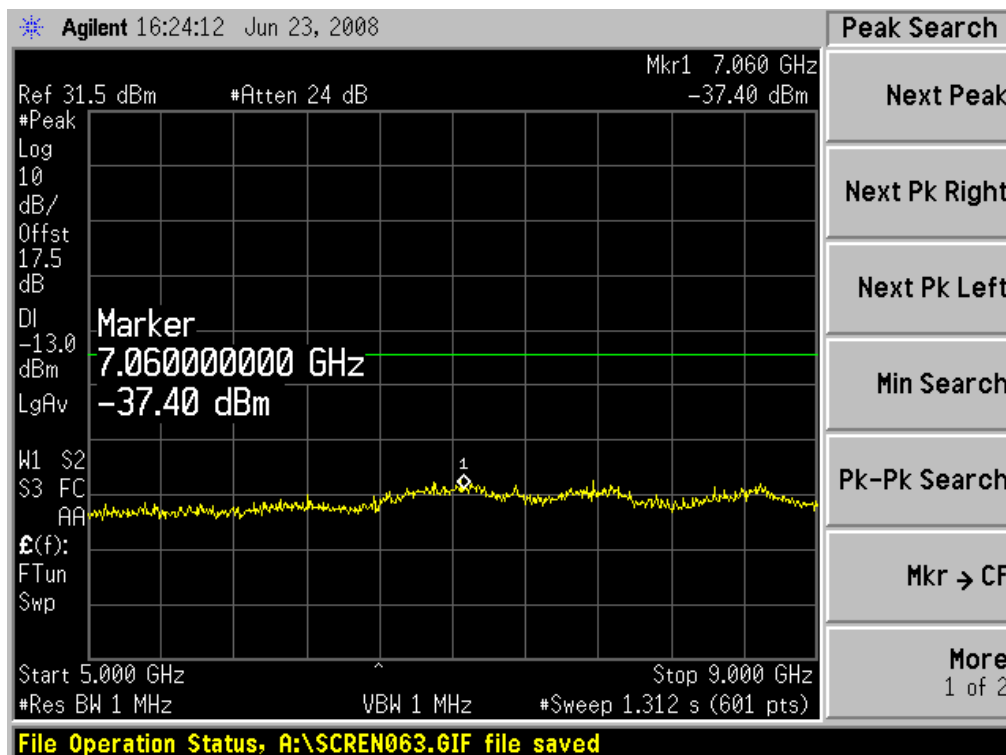


Channel 777, 824MHz~849MHz

Note: The signal beyond the limit is carrier.



Channel 777, 849MHz~5GHz



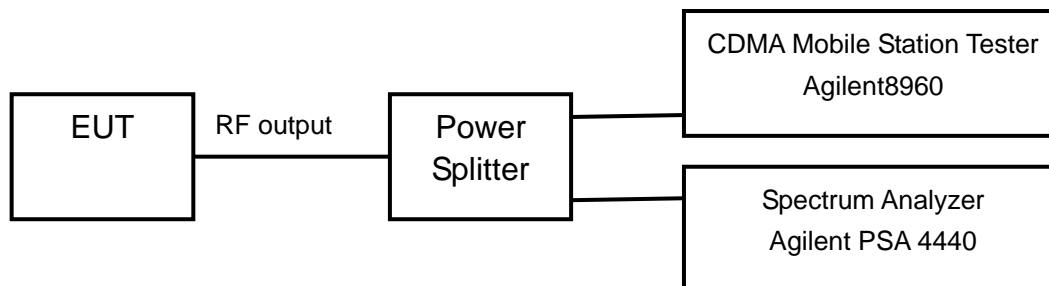
Channel 777, 5GHz~9GHz

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

Ambient condition:

Temperature	Relative humidity	Pressure
18°C	40%	102.5kPa

Test Setup:



Test procedure:

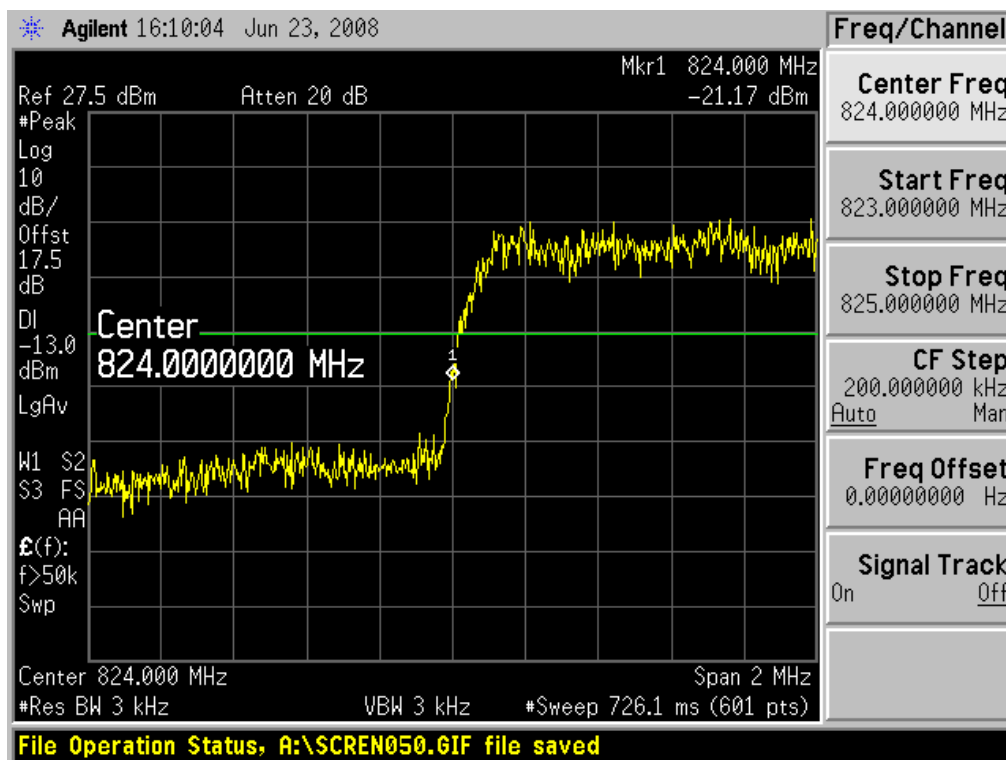
After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The peak detector is used and RBW is set to 3kHz on spectrum analyzer.

The measurement will be conducted at two channels No.1013, and No.777 (Bottom and top channels of CDMA 1X band) in RC3/SO55 test mode.

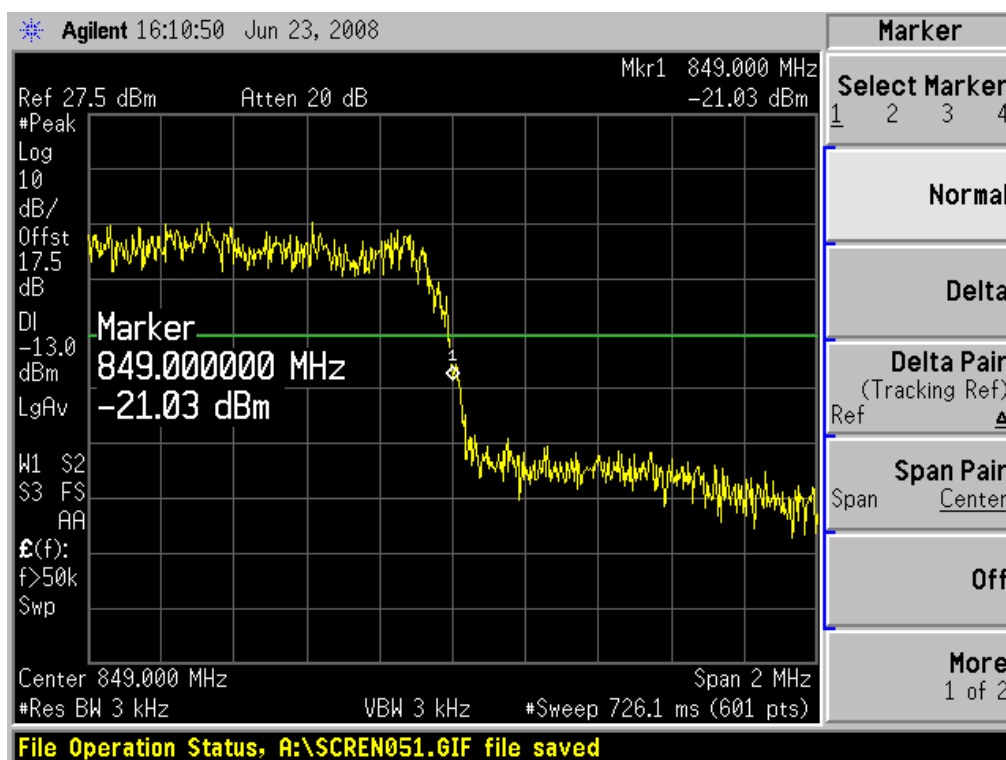
Limits	$\leq -13\text{dBm}$
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Test result:

Refer to the following figures.



Channel 1013



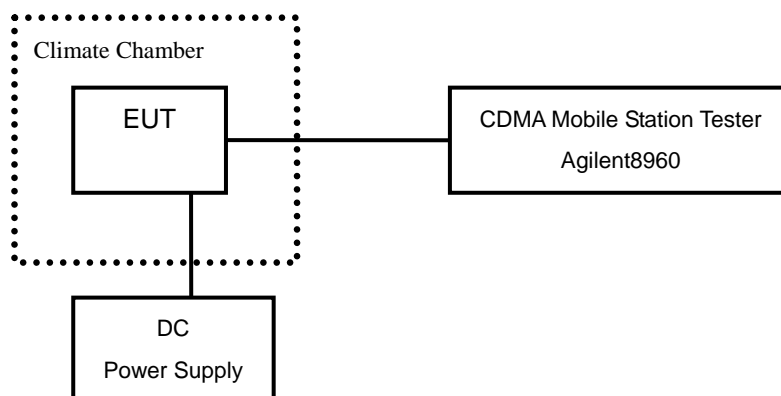
Channel 777

2.2.6 Frequency Stability-FCC Part2.1055/22.355

Ambient condition:

Temperature	Relative humidity	Pressure
18°C	40%	102.5kPa

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 3.1V to 4.2 V. The measurement will be conducted at three channels No.1013, No.384 and No.777 (Bottom, middle and top channel of CDMA 1X band) in RC3/SO55 test mode.

Limits	≤2.5ppm
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Test Result:

Temperature(°C)	Test Result (ppm) @3.7V power supply		
	Channel 1013	Channel 384	Channel 777
-30	0.001	0.002	0.002
-20	0.002	0.001	0.001
-10	0.001	0.002	0.002
0	0.002	0.001	0.001
+10	0.001	0.003	0.001
+20	0.002	0.002	0.002
+30	0.001	0.002	0.003
+40	0.002	0.003	0.002
+50	0.001	0.001	0.002

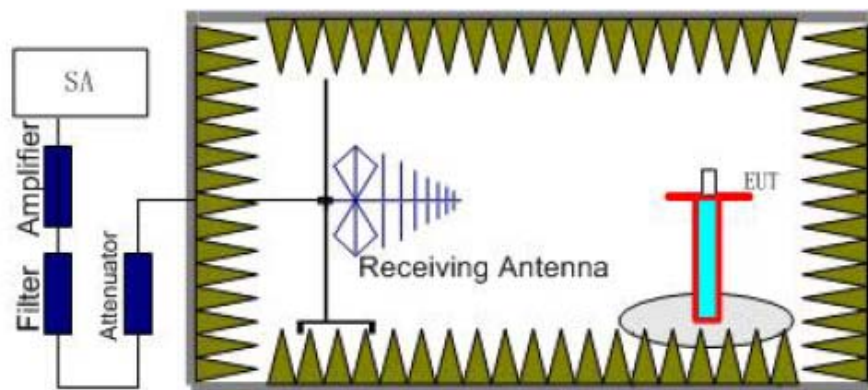
Voltage (V)	Test Result (ppm)@20° C		
	Channel 1013	Channel 384	Channel 777
3.1	0.019	0.029	0.036
4.2	0.005	0.009	0.004

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

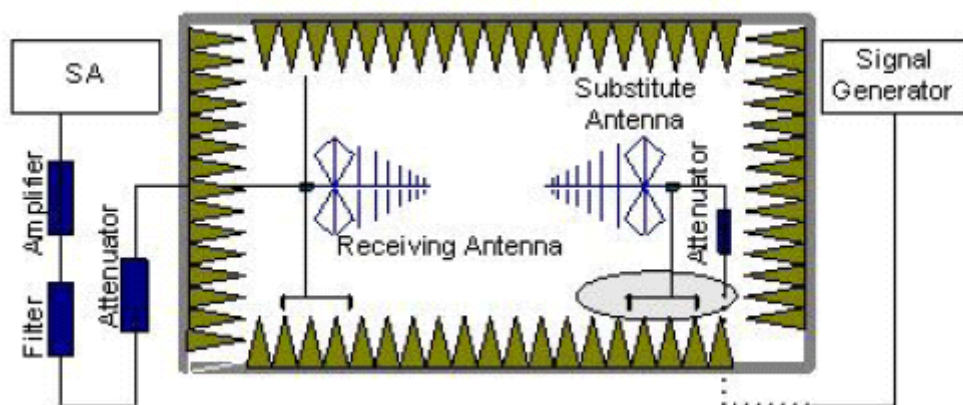
Ambient condition

Temperature	Relative humidity	Pressure
18°C	40%	102.5kPa

Test Setup:



Step 1



Step 2

Test procedure:

The measurement was done according to TIA/EIA 603C.

Step 1:

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

established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer or receiver. The spectrum analyzer scans from 30MHz to 9GHz (higher than the 10th harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer. Then the antenna height and turn table rotation is adjusted till the maximum power value is founded on spectrum analyzer or receiver. A notch filter is necessary in the band near to the carrier frequency. A high pass filter is needed to avoid the distortion of the testing equipment in the band above the carrier frequency.

Step 2:

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

Calculation procedure:

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

The power of the Radiated Spurious Emissions is calculated by adding the cable loss, antenna gain and air loss. The basic equation with a sample calculation is as followed:

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

Where

P: Power of the Radiated Spurious Emissions (dBm)

P_R: reading of the receiver (dBm)

L_C: Cable Lose (dB)

L_A: Air loss (dB)

G: Antenna Gain (dBi)

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

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

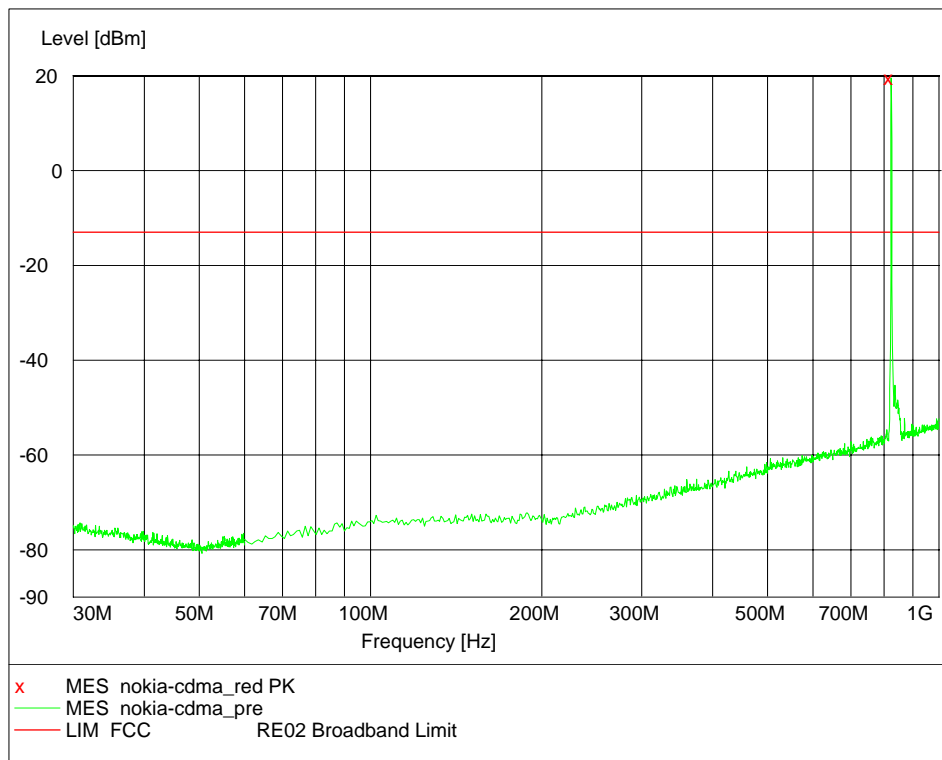
The measurement will be conducted at three channels No.1013, No.384 and No.777 (Bottom, middle and top channels of CDMA 1X band) in RC3/SO55 test mode.

Limits	≤ -13dBm
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Test result:

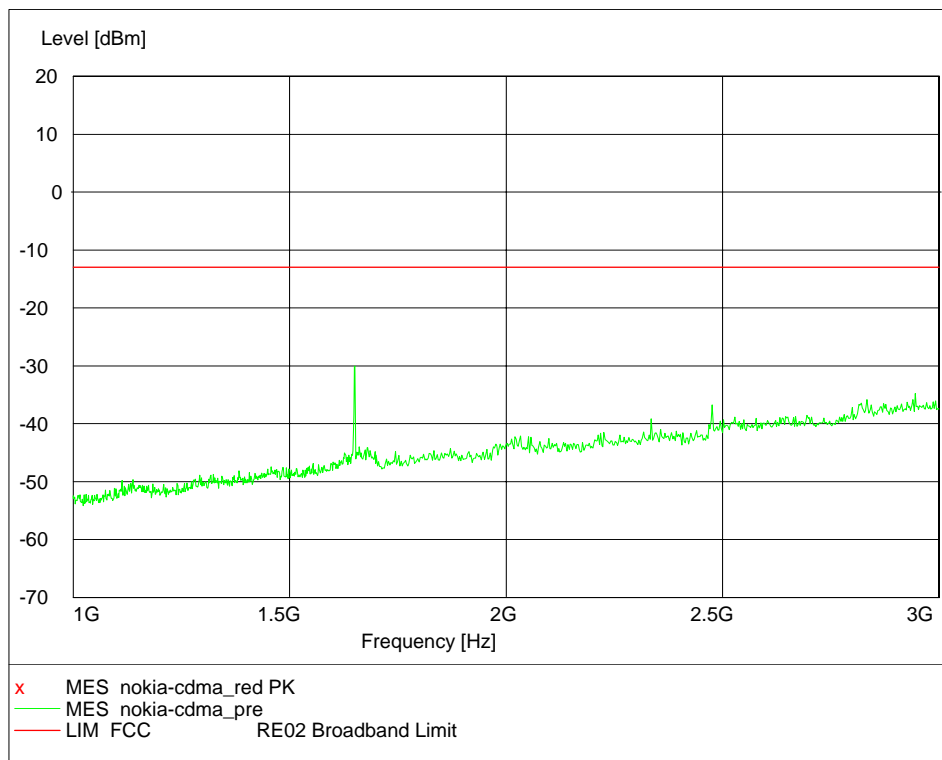
Refer to the following figures.

Channel 1013:

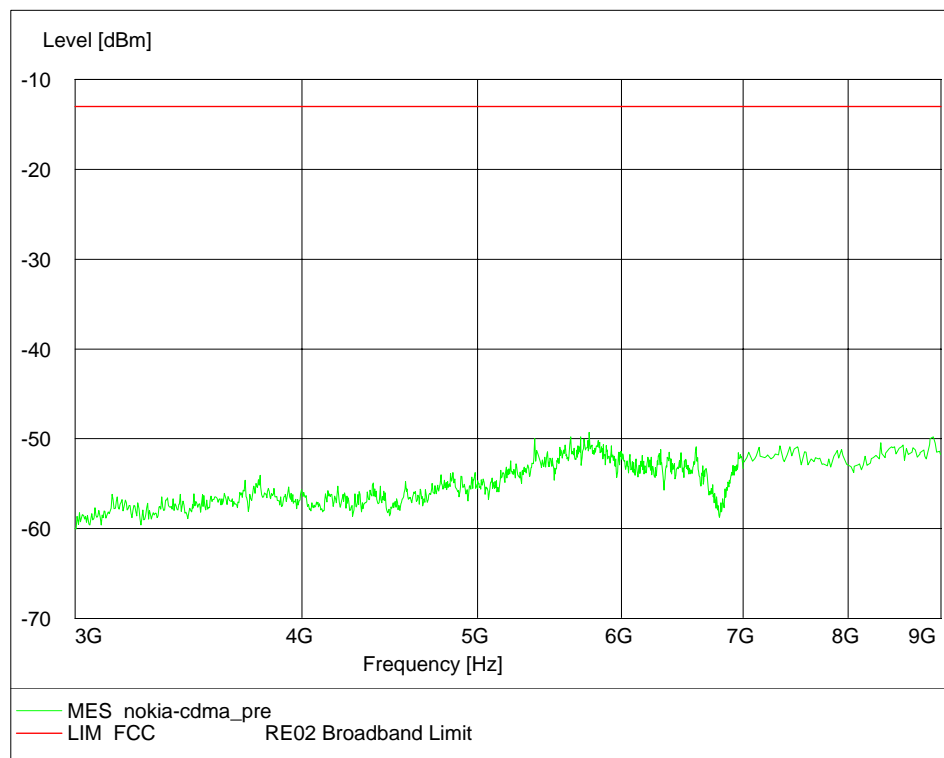


Channel 1013, 30MHz~1GHz

Note: The signal beyond the limit is carrier.



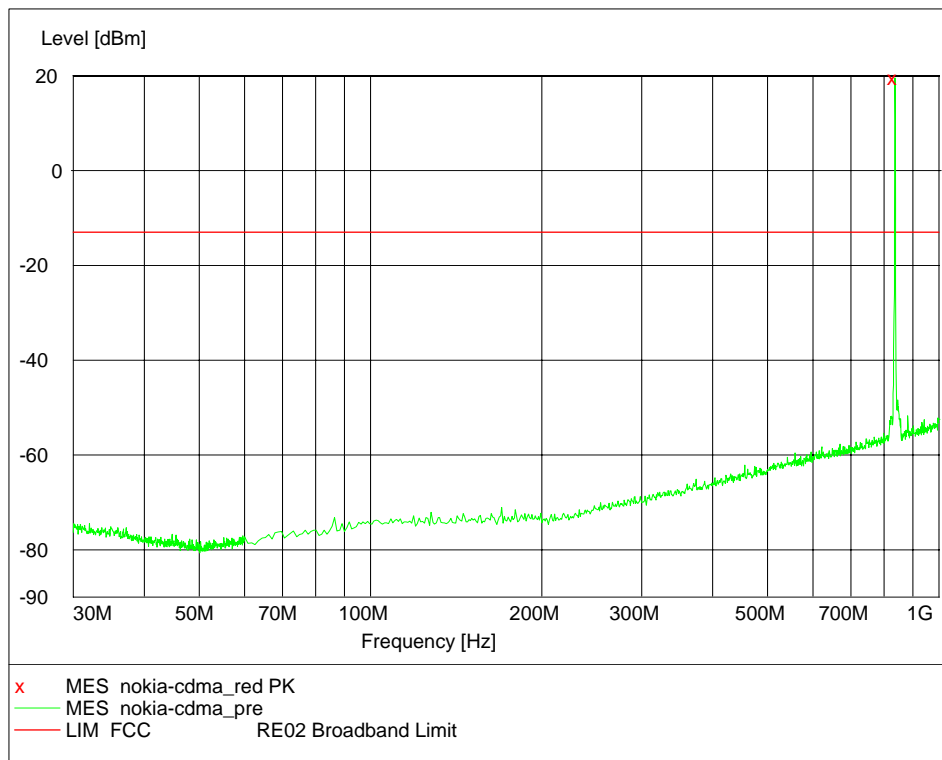
Channel 1013, 1GHz~3GHz



Channel 1013, 3GHz~9GHz

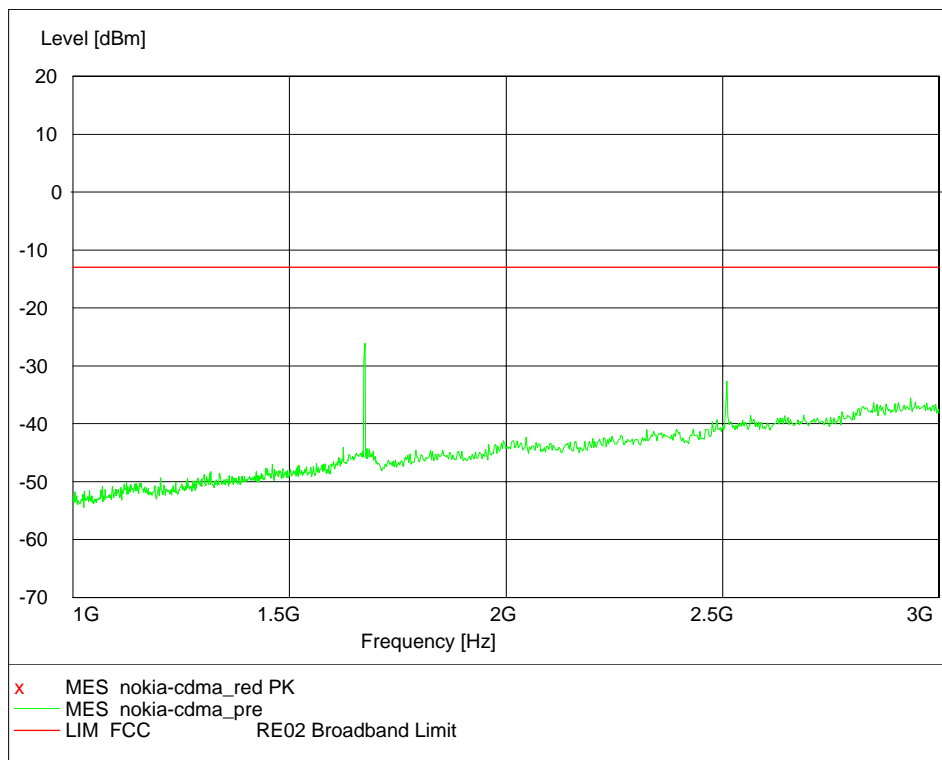
Frequency (MHz)	Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1649.40	Vertical	-30.02	-13	17.02
2474.10	Vertical	-37.51	-13	24.51

Channel 384:

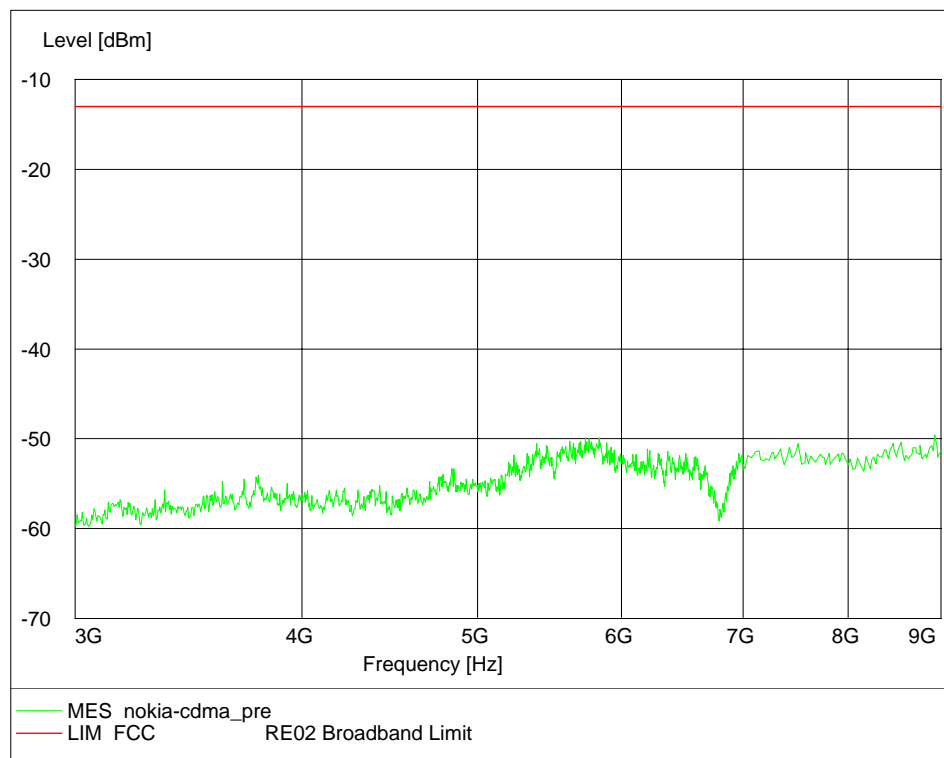


Channel 384, 30MHz~1GHz

Note: The signal beyond the limit is carrier.



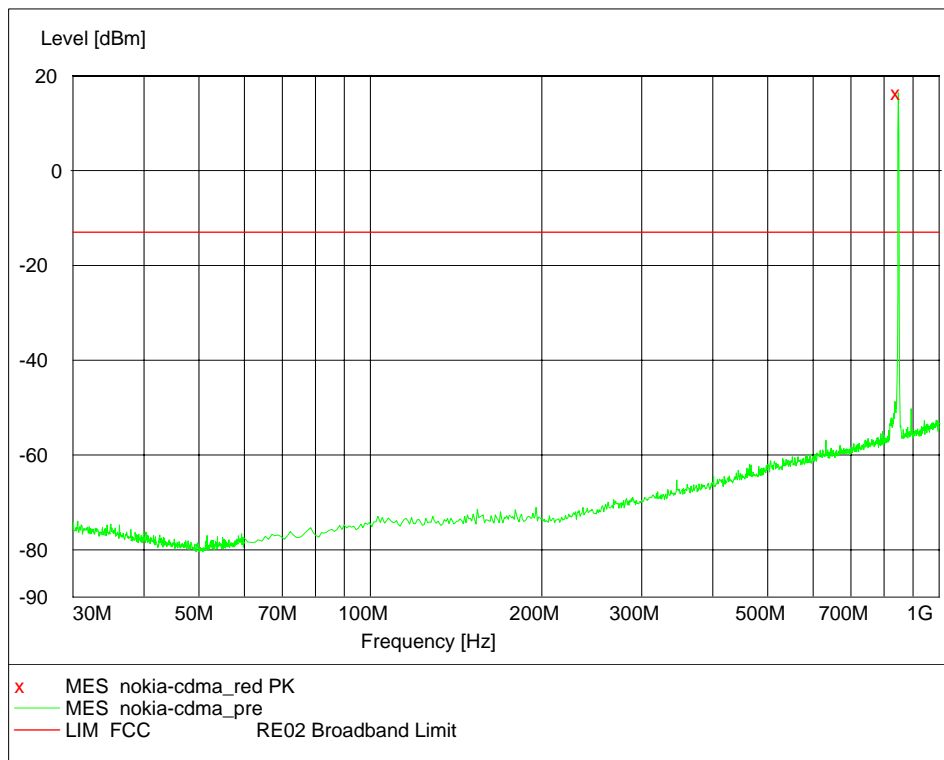
Channel 384, 1GHz~3GHz



Channel 384, 3GHz~9GHz

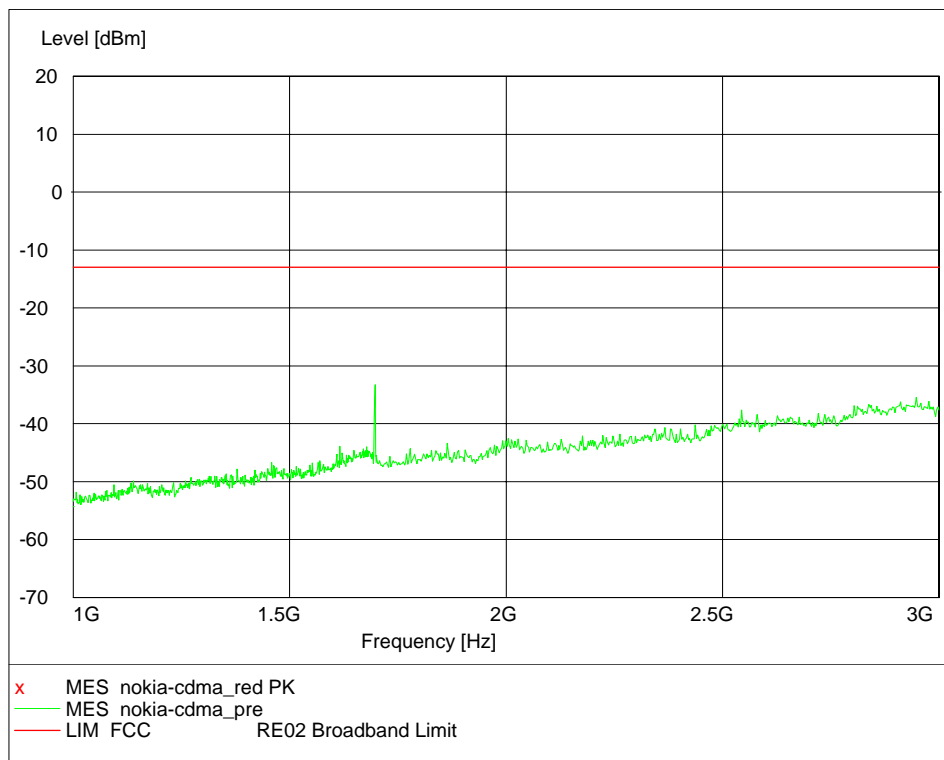
Frequency (MHz)	Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1673.04	Vertical	-25.56	-13	12.56
2509.56	Vertical	-32.16	-13	19.16

Channel 777 :

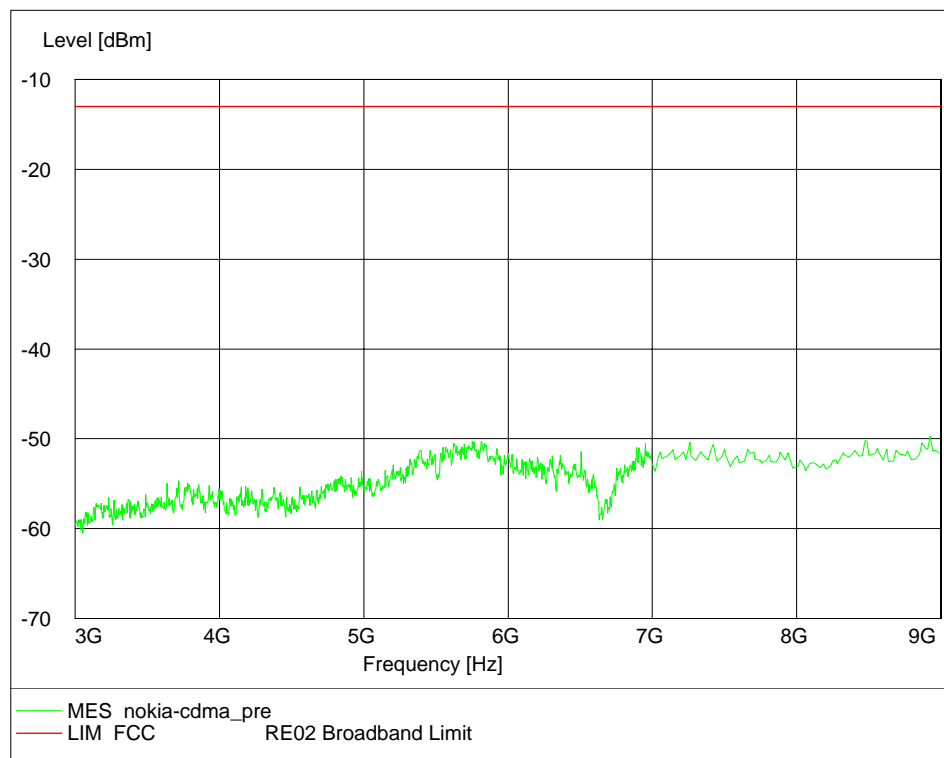


Channel 777, 30MHz~1GHz

Note: The signal beyond the limit is carrier.



Channel 777, 1GHz~3GHz



Channel 777, 3GHz~9GHz

Frequency (MHz)	Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1696.62	Vertical	-32.68	-13	19.68
2544.93	Vertical	-38.21	-13	25.21

2.3. List of test equipments

No.	Name/Model	Manufacturer	S/N	Calibration Date
1	E5515C(8960) Mobile Station Tester	Agilent	GB44050904	19 th Aug. 2007
2	PSA E4440A Spectrum Analyzer	Agilent	MY41000183	19 th Aug. 2007
5	66309B DC Power Supply	Agilent	MY43000461	19 th Aug. 2007
6	1506A Power Splitter	Weinschel	MN154	19 th Aug. 2007
7	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	19 th Aug. 2007
8	ESI 40 EMI test receiver	R&S	100015	19 th Aug. 2007
9	SMR 20 Signal generator	R&S	100086	19 th Aug. 2007
10	CMU 200 Radio tester	R&S	100313	19 th Aug. 2007
11	12.65m*8.03m*7.50m Fully-Anechoic Chamber	FRANKONIA	-----	19 th Aug. 2007
12	HL562 Ultra log test antenna	R&S	100016	19 th Aug. 2007
13	23.18m×16.88m×9.60m Semi-Anechoic Chamber	FRANKONIA	-----	19 th Aug. 2007
14	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100030	19 th Aug. 2007
15	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100029	19 th Aug. 2007
16	PS2000 Turn Table	FRANKONIA	-----	19 th Aug. 2007
17	MA260 Antenna Master	FRANKONIA	-----	19 th Aug. 2007
18	SH-241 Climatic Chamber	ESPEC	92000389	19 th Aug. 2007
19	ES-K1 EMI test software	R&S	-----	19 th Aug. 2007
20	HL562 Receive antenna	R&S	100167	19 th Aug. 2007

Appendix