



TEST REPORT

Report No.: SRMC2008-H024-E0057

Product Name: GSM/GPRS Digital Mobile Phone with
Bluetooth

Product Model: i410

Applicant: verykool USA, Inc.

Manufacture: Longcheer Technology Co.ltd

Specification: FCC Part 24E, Part22H, Part 2, Part 15B

FCC ID: WA6I410

The State Radio Monitoring Center, Equipment Testing Division

The State Radio Spectrum Monitoring and Testing Center

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, 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
Fax: +86 10 68009195
Email: Wangjf@srrc.org.cn

1.3 Applicant's details

Company: verykool USA, Inc.
Address: 4350 Executive Drive. Suite 100, San Diego, CA 92121,
USA
City: San Diego
Country or Region: USA
Grantee Code: WA6
Contacted person: Sunny Choi
Tel: +1-858-373-1600 / +1-858-2489036
Fax: +1-858-373-1505
Email: sunny.choi@infosonics.com

1.4 Manufacturer's details

Company: Longcheer Technology Co.ltd
Address: Building NO.401 Caobao RD ,Xuhui District Shanghai,
200233, P.R.China
City: Shanghai
Country or Region: P.R.China
Grantee Code: WA6
Contacted person: Wang Lei
Tel: 021-64088898-4116
Fax: 021-54970876
Email: wangleilc@longcheer.net

1.5 Application details

Date of receipt of application: 18th August 2008

Date of receipt of test sample: 18th August 2008

Date of test: 21st August 2008 to 28th August 2008

1.6 Reference specification

FCC Part 24E, Part22H, Part 2, Part 15B

1.7 Information of EUT

1.7.1 General information

| | |
|----------------------------|---|
| Name of EUT | GSM/GPRS Digital Mobile Phone with Bluetooth |
| FCC ID | WA6I410 |
| Frequency range | GSM850: Tx:824~849MHz Rx:869~894MHz PCS1900: Tx:1850~1910MHz Rx:1930~1990MHz |
| Rated output power | GSM850:33.0dBm PCS1900:30.0dBm |
| E.R.P. & E.I.R.P. | GSM850: 5.46dBm PCS1900: 25.87dBm |
| Modulation type | GMSK |
| Duplex mode | FDD |
| Duplex spacing: | GSM850:45MHz PCS1900:80MHz |
| Antenna type | Integral |
| Power Supply | Battery or charger |
| Rated Power Supply Voltage | 3.7V |
| Extreme Power Supply | Min: 3.4V Max: 4.2V |
| Extreme Temperature | -30°C~+50°C |
| H/W Version | LBLM401C2-1 |
| S/W Version | LBL0001.1.0_M401C |

1.7.2 EUT details

| Name | Model | IMEI |
|--|-------|----------------|
| GSM/GPRS Digital Mobile Phone with Bluetooth | i410 | 13579024681220 |

1.7.3 Auxiliary equipment details

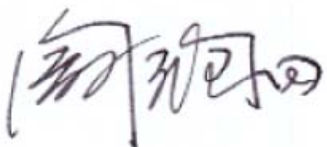
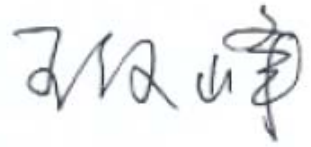
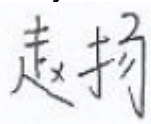
| Equipment | Charger |
|--------------|--------------------|
| Manufacturer | Verykool USA, Inc. |
| Model Number | ASUC1-050050 |

| Equipment | Battery |
|--------------|--------------------|
| Manufacturer | Verykool USA, Inc. |
| Model Number | 453X |

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 Isotropic Radiated Power | 22.913/24.232 | Pass |
| 3 | Occupied Bandwidth, | 2.1049 | Pass |
| 4 | Spurious Emissions at antenna terminals | 2.1051/22.917/24.238 | Pass |
| 5 | Band Edges Compliance | 2.1051/22.917/24.238 | Pass |
| 6 | Frequency Stability | 2.1055/24.235/22.355 | Pass |
| 7 | Radiated Spurious Emissions | 2.1053/22.917/24.238 | Pass |
| 8 | Conducted emissions | 15.107 | Pass |
| 9 | Radiated emissions | 15.109 | Pass |

| | |
|---|---|
| This Test Report Is Issued by:  | Checked by:  |
| Tested by:  | Issued date: 11 th Sep. 2008 |

2.2 Test result

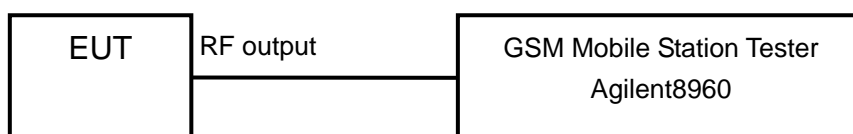
2.2.1 GSM/GPRS850

2.2.1.1 RF Power Output –FCC Part2.1046

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

Test Setup:



Test procedure:

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

The measurement will be conducted at three channels No128, No189 and No251 (Bottom, middle and top channels of GSM850 band)

| | |
|--------|---------------------|
| Limits | $\leq 33\text{dBm}$ |
|--------|---------------------|

Test result:

GSM/GPRS MODE:

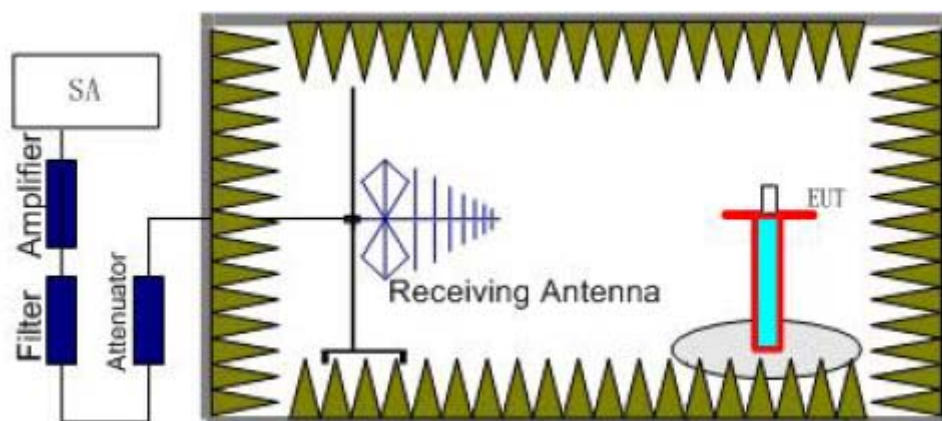
| Carrier frequency (MHz) | Channel No. | RF Power Output (dBm) |
|----------------------------|-------------|--------------------------|
| 824.2 | 128 | 32.0 |
| 836.4 | 189 | 32.2 |
| 848.8 | 251 | 32.3 |

2.2.1.2 Effective Radiated Power-FCC Part22.913

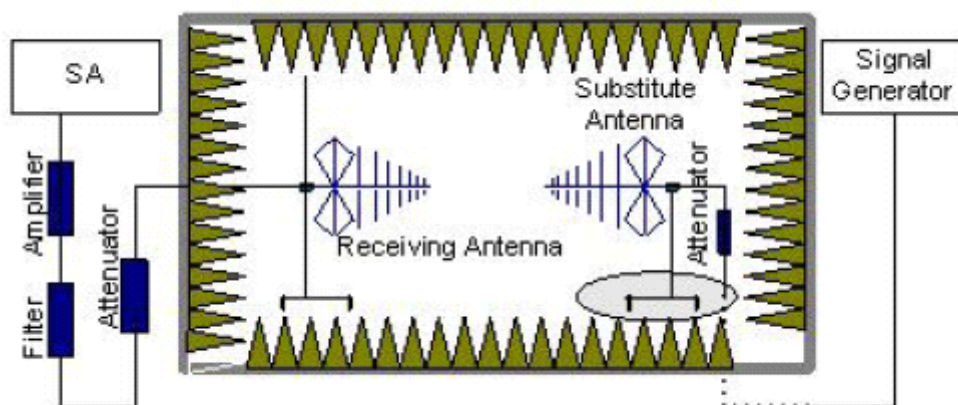
Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

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 No128, No189 and No251 (Bottom, middle and top channels of GSM850 band)

| | |
|--------|-----------------------|
| Limits | $\leq 38.5\text{dBm}$ |
|--------|-----------------------|

Test result:

GSM/GPRS MODE:

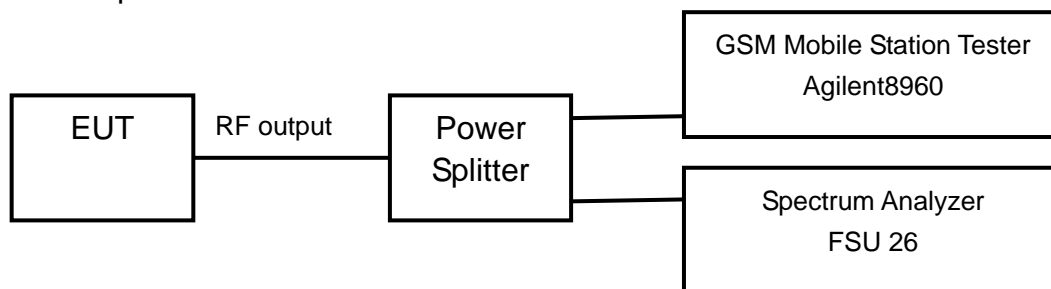
| Carrier frequency (MHz) | Channel No. | E.R.P. (dBm) |
|-------------------------|-------------|--------------|
| 824.2 | 128 | 3.74 |
| 836.4 | 189 | 4.79 |
| 848.8 | 251 | 5.46 |

2.2.1.3 Occupied Bandwidth-FCC Part2.1049

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The occupied bandwidth is measured using spectrum analyzer. RBW is set to 3kHz on spectrum analyzer. The bandwidth of 99% power can be read on spectrum analyzer. The measurement will be conducted at three channels No128, No189 and No251 (Bottom, middle and top channels of GSM850 band).

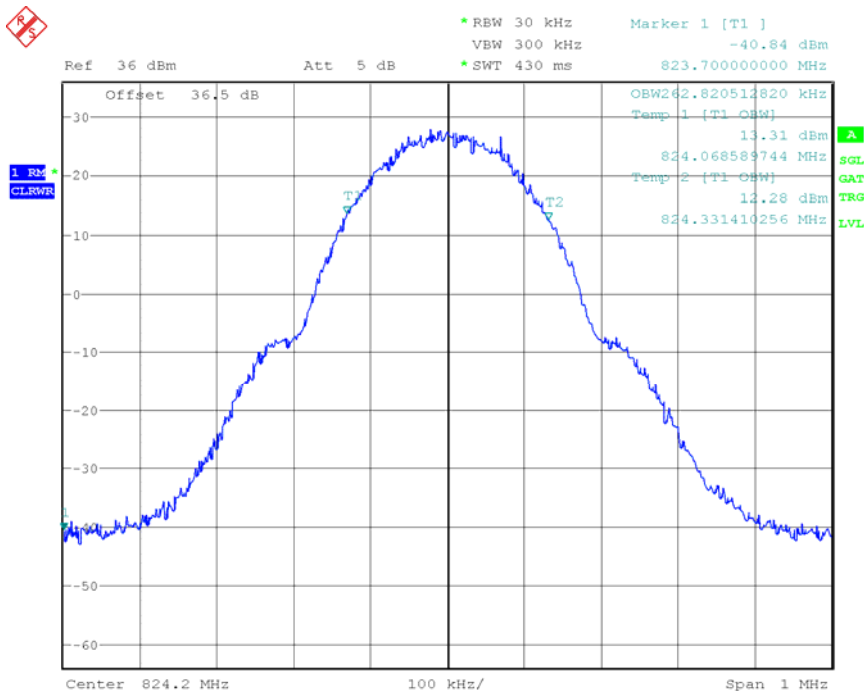
Limits: No specific occupied bandwidth requirements in part 2.1049

Test result:

GSM/GPRS MODE:

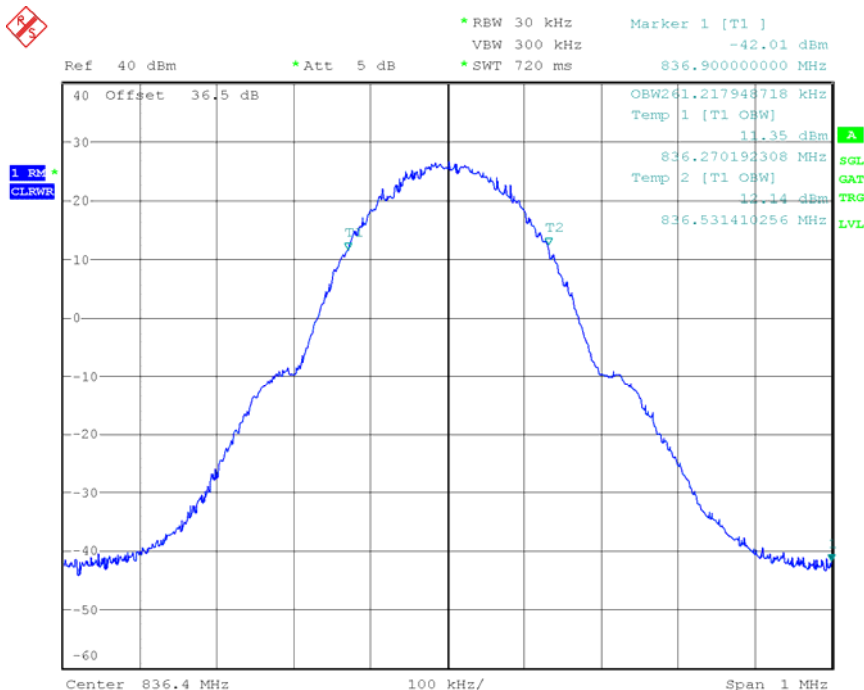
| Carrier frequency (MHz) | Channel No. | Bandwidth of 99% Power (kHz) |
|-------------------------|-------------|------------------------------|
| 824.2 | 128 | 262.82 |
| 836.4 | 189 | 261.22 |
| 848.8 | 251 | 262.82 |

GSM/GPRS MODE:



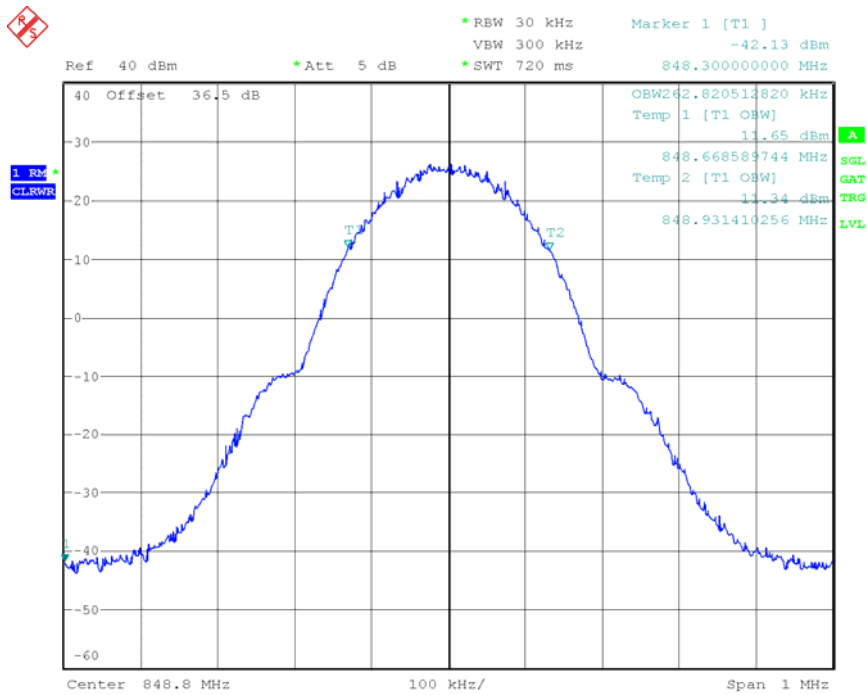
Date: 21.AUG.2008 10:42:33

Channel 128



Date: 21.AUG.2008 11:08:15

Channel 189



Date: 21.AUG.2008 11:08:47

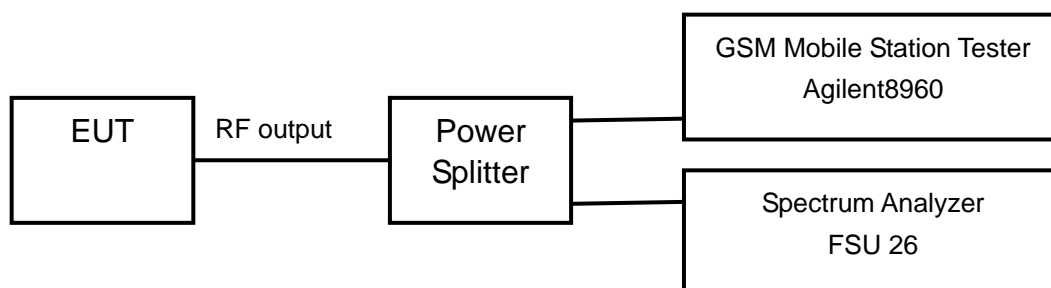
Channel 251

2.2.1.4 Spurious Emissions at antenna terminals-FCC Part2.1051/22.917

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

Test Setup:



Test procedure:

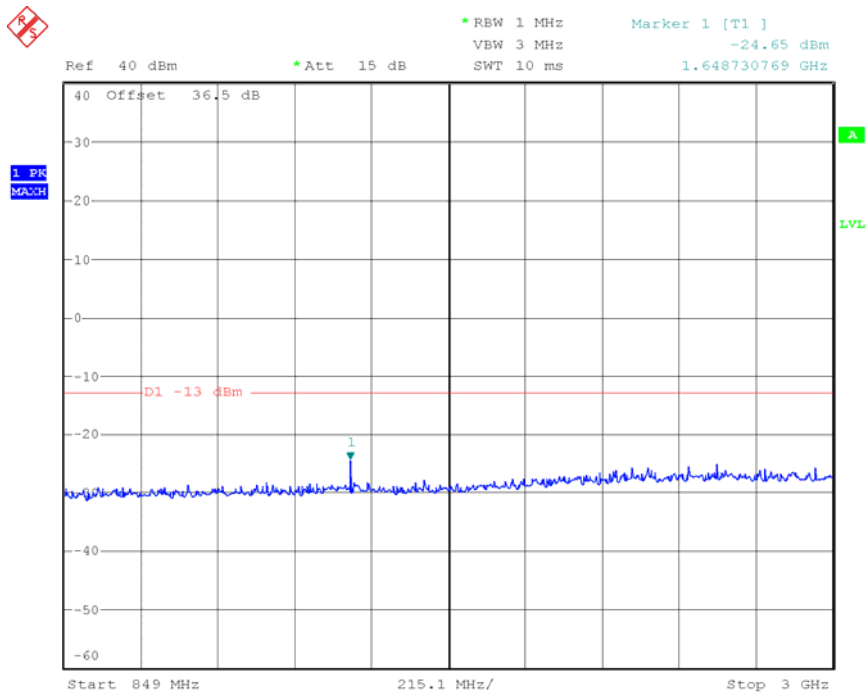
After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to 20GHz (higher than the 10th harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer.

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

| | |
|--------|----------|
| Limits | ≤ -13dBm |
|--------|----------|

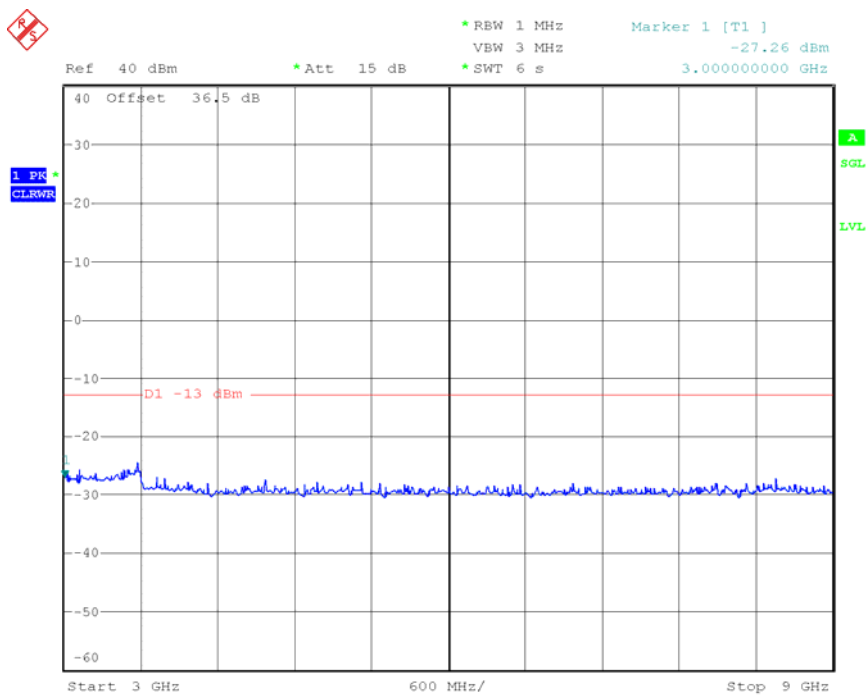
Test result:

Refer to the following figures.



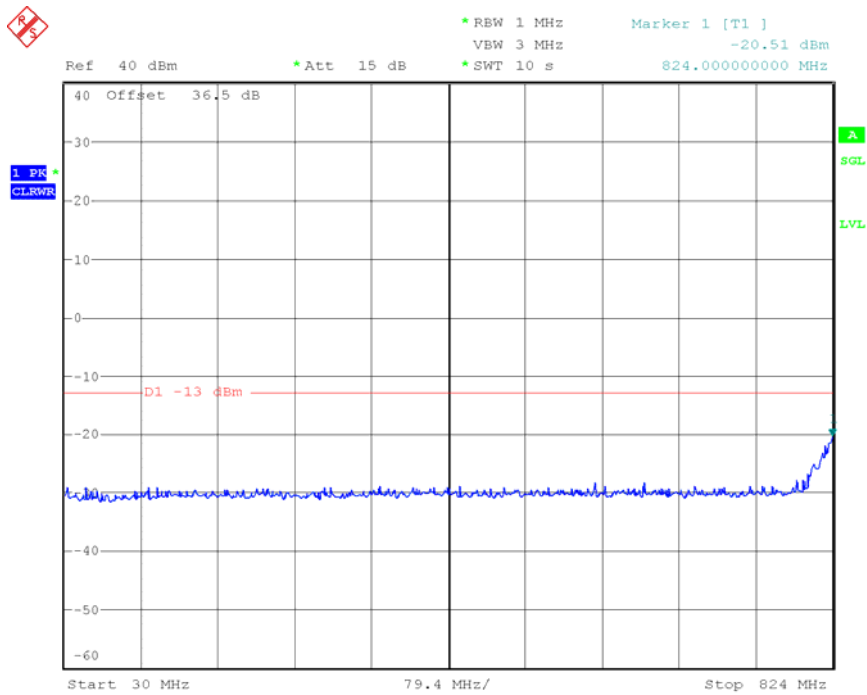
Date: 21.AUG.2008 11:15:39

Channel 128, 849MHz~3GHz



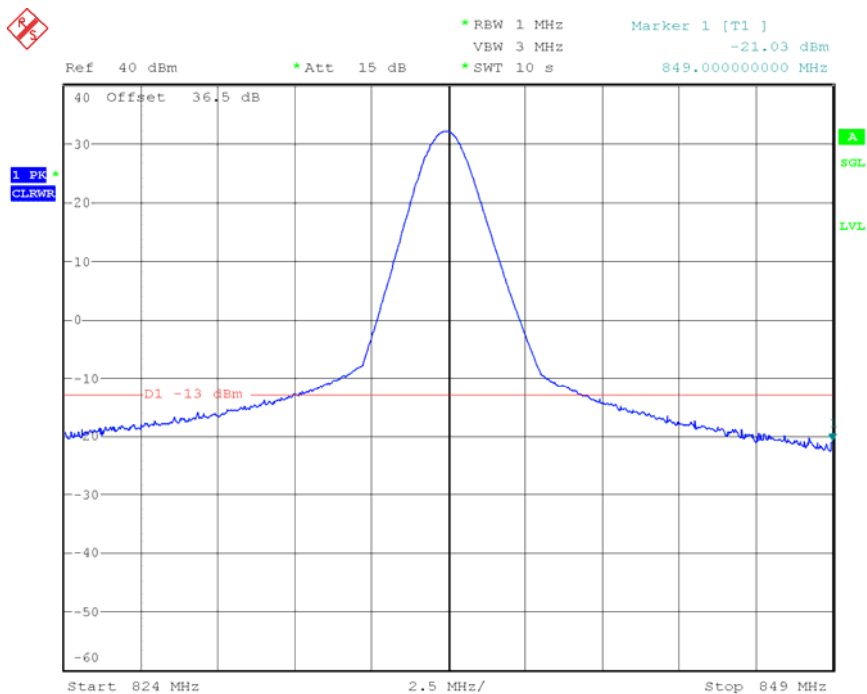
Date: 21.AUG.2008 11:18:54

Channel 128, 3GHz ~9 GHz



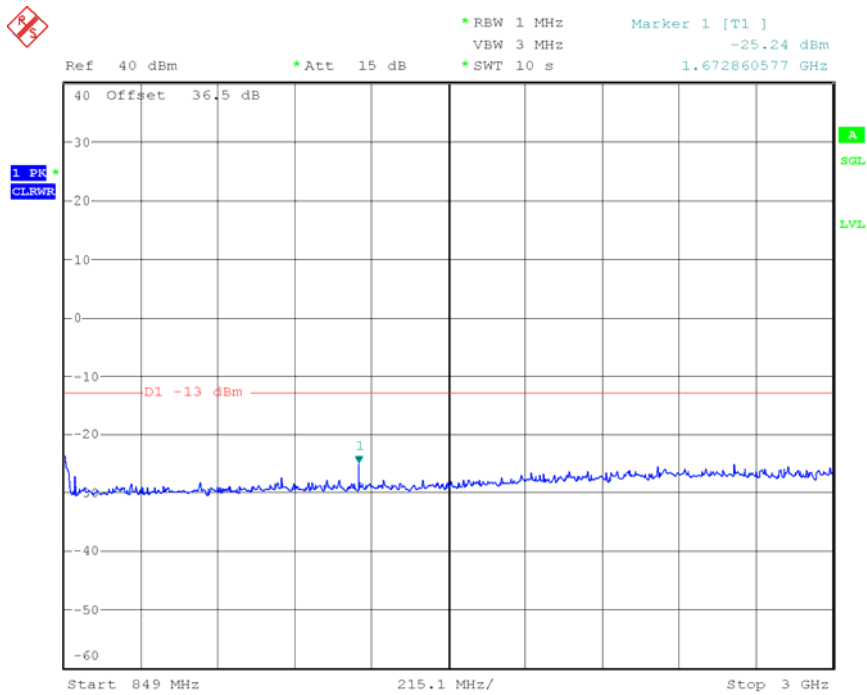
Date: 21.AUG.2008 11:21:27

Channel 189, 30MHz~824MHz



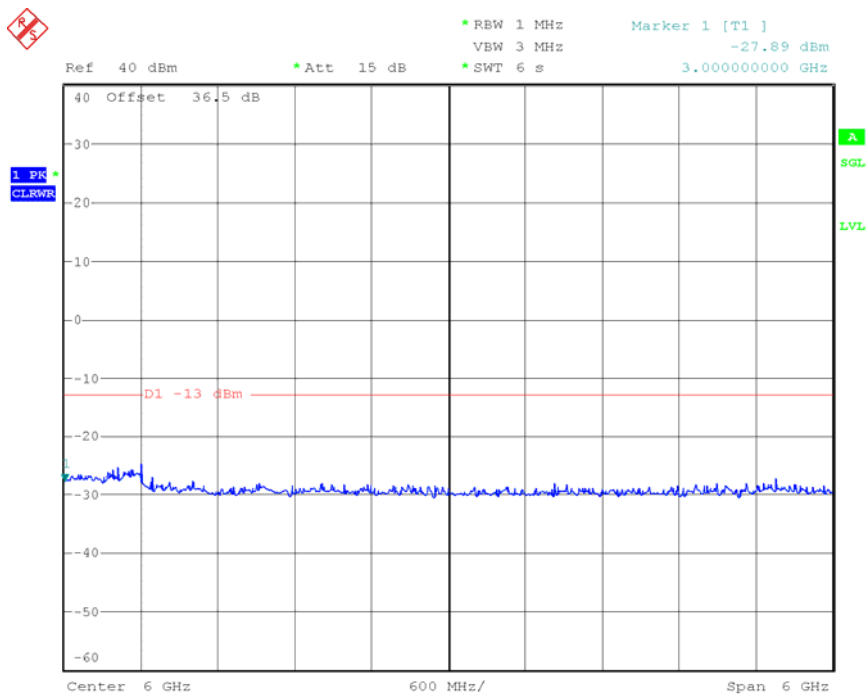
Date: 21.AUG.2008 11:21:02

Channel 189, 824MHz~849MHz



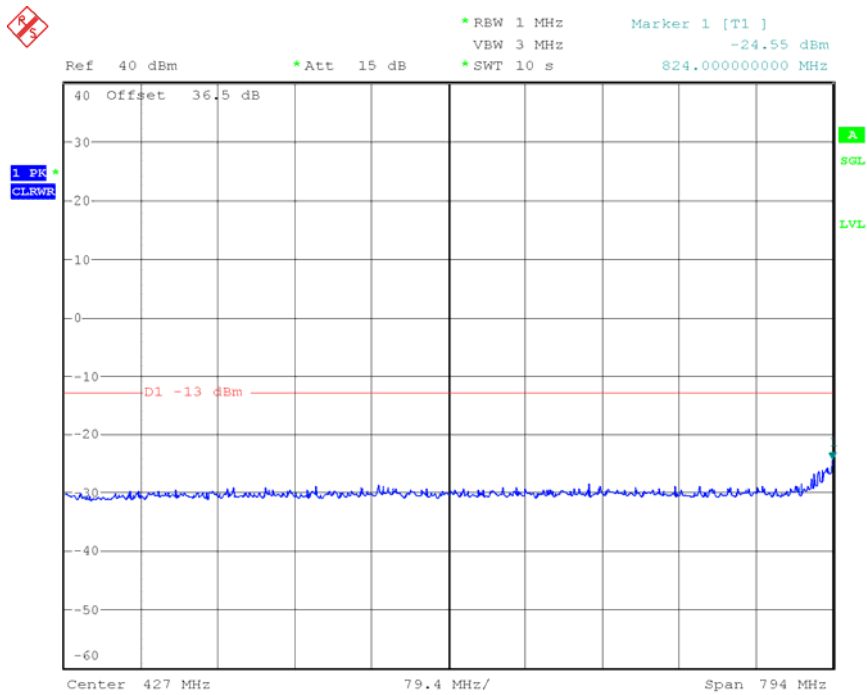
Date: 21.AUG.2008 11:20:31

Channel 189, 849MHz~3GHz



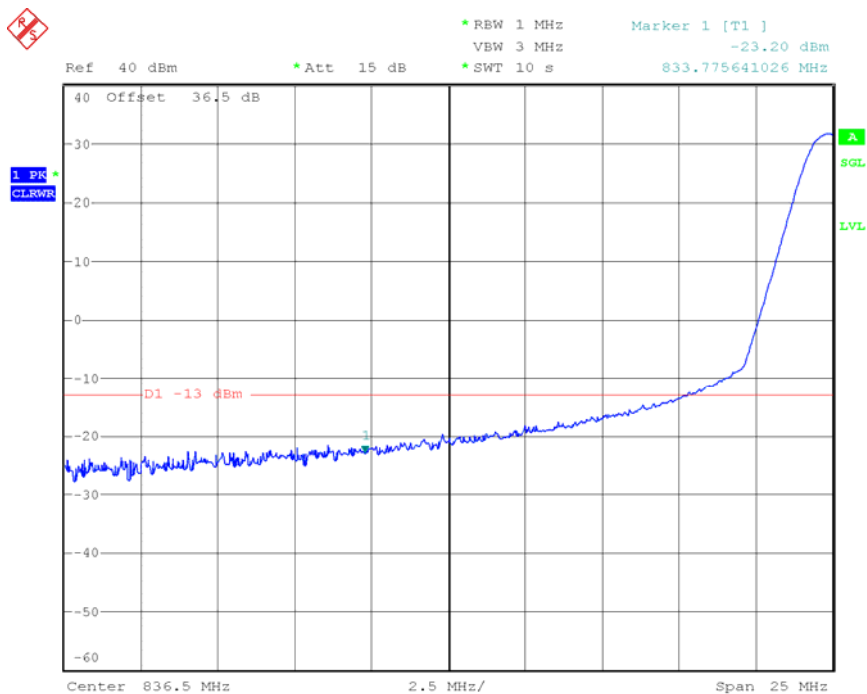
Date: 21.AUG.2008 11:19:25

Channel 189, 3GHz~9GHz



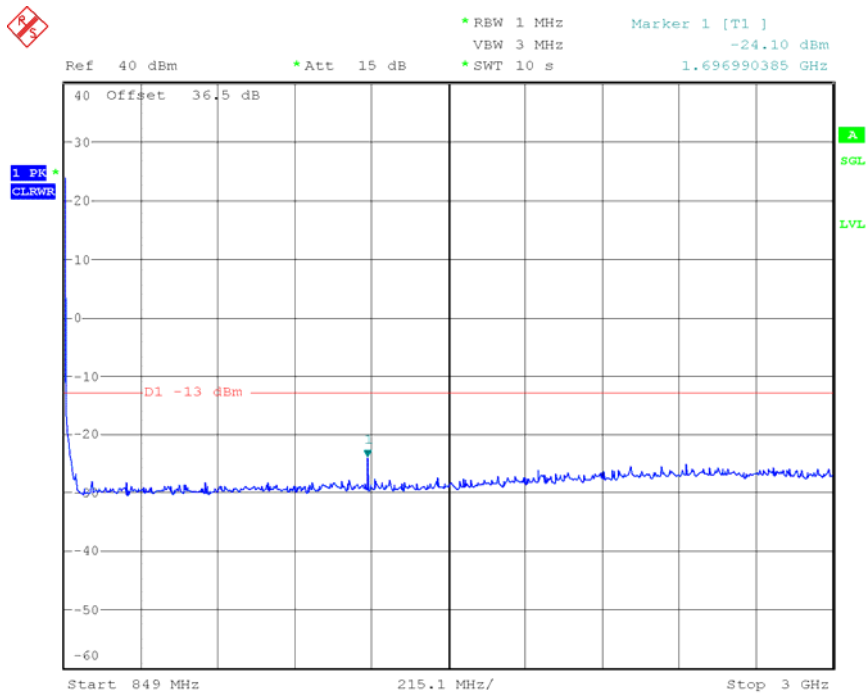
Date: 21.AUG.2008 11:22:23

Channel 251, 30MHz~824MHz



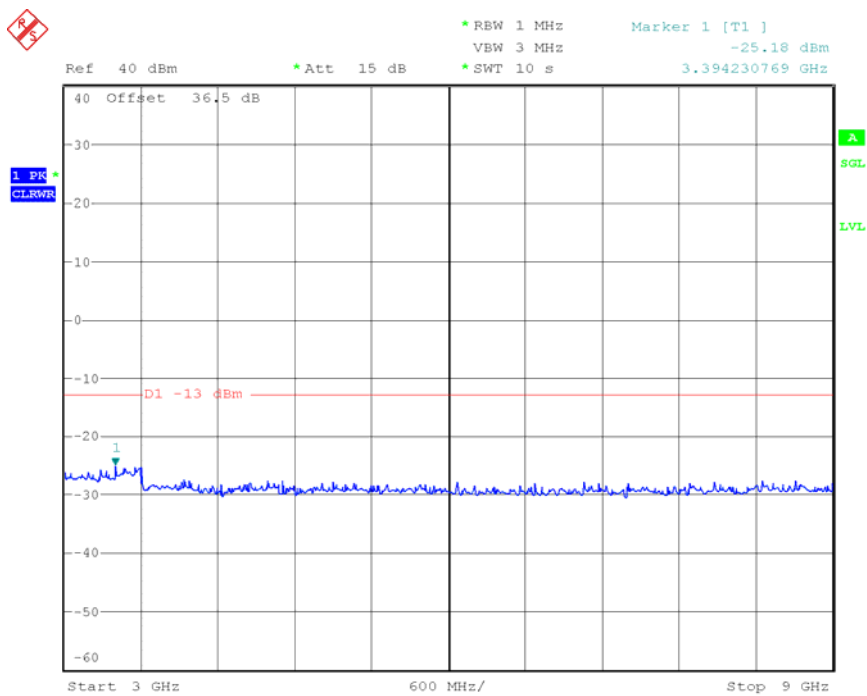
Date: 21.AUG.2008 11:23:15

Channel 251, 824MHz~849MHz



Date: 21.AUG.2008 11:24:03

Channel 251, 849MHz~3GHz



Date: 21.AUG.2008 11:24:41

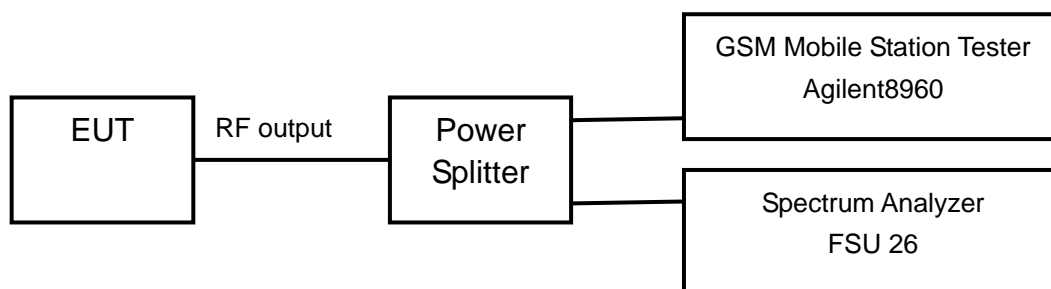
Channel 251, 3GHz~9GHz

2.2.1.5 Band Edges Compliance- FCC Part2.1051/22.917

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

Test Setup:



Test procedure:

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

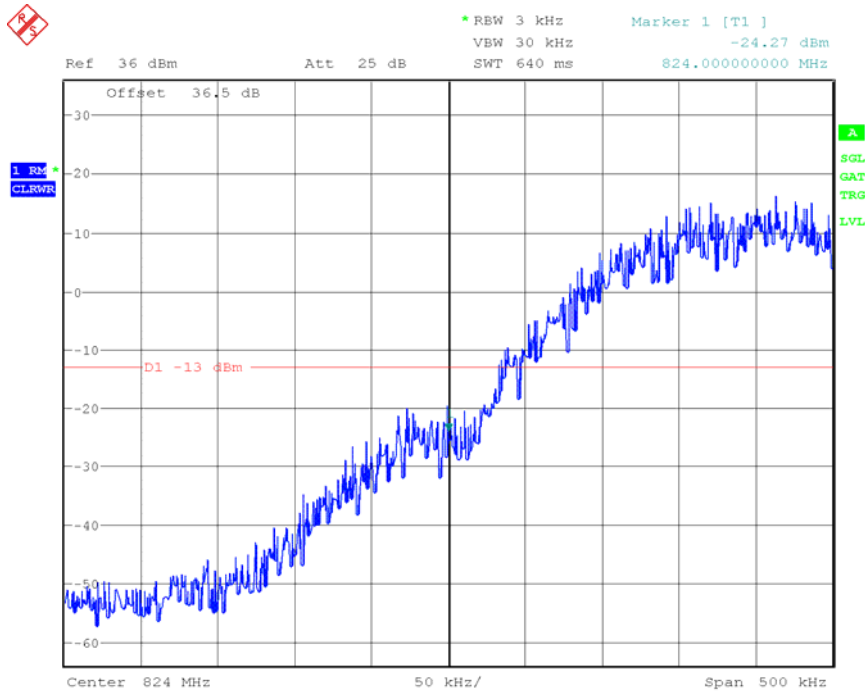
The measurement will be conducted at two channels No128 and No251 (Bottom and top channels of GSM850 band)

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

Test result:

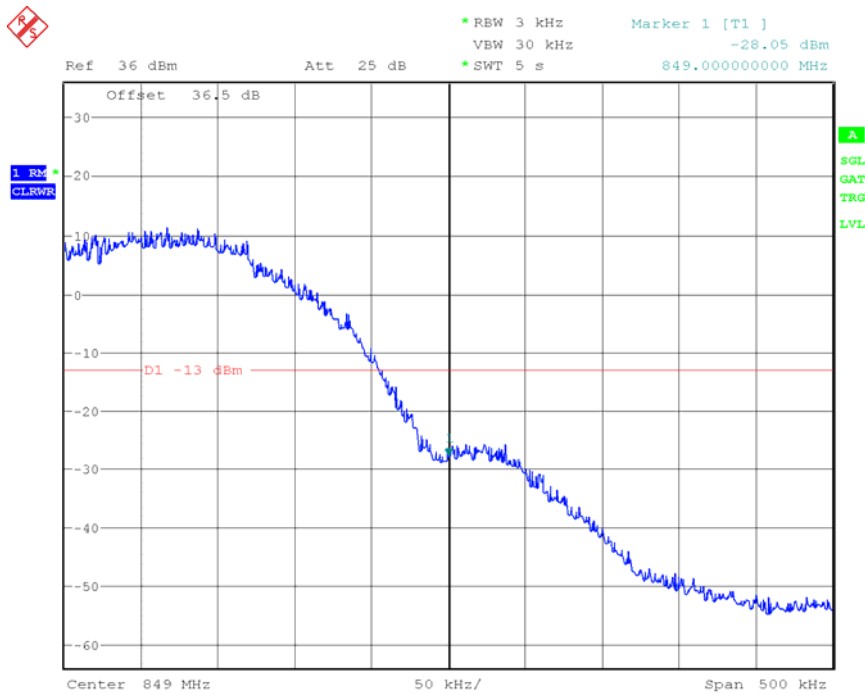
Refer to the following figures.

GSM/GPRS MODE:



Date: 21.AUG.2008 10:45:02

Channel 128



Date: 21.AUG.2008 10:49:11

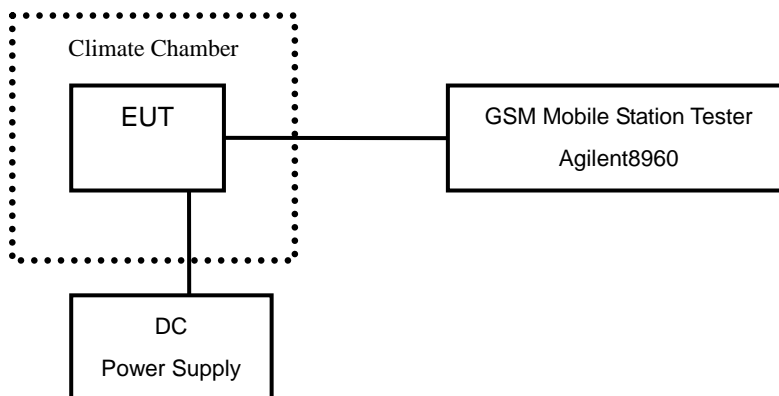
Channel 251

2.2.1.6 Frequency Stability-FCC Part2.1055/Part22.355

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

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 3.4 to 4.2 V.

Limits: No specific frequency stability requirements in part 2.1055 and part 22.355

Test Result:

GSM/GPRS MODE:

| Temperature(° C) | Test Result (ppm) | | |
|---------------------|-------------------|-------------|-------------|
| | Channel 128 | Channel 189 | Channel 251 |
| -30 | --- | 0.008 | --- |
| -20 | --- | 0.010 | --- |
| -10 | --- | 0.017 | --- |
| 0 | --- | 0.006 | --- |
| +10 | --- | 0.004 | --- |
| +20 | --- | 0.003 | --- |
| +30 | --- | 0.004 | --- |
| +40 | --- | 0.009 | --- |
| +50 | --- | 0.011 | --- |

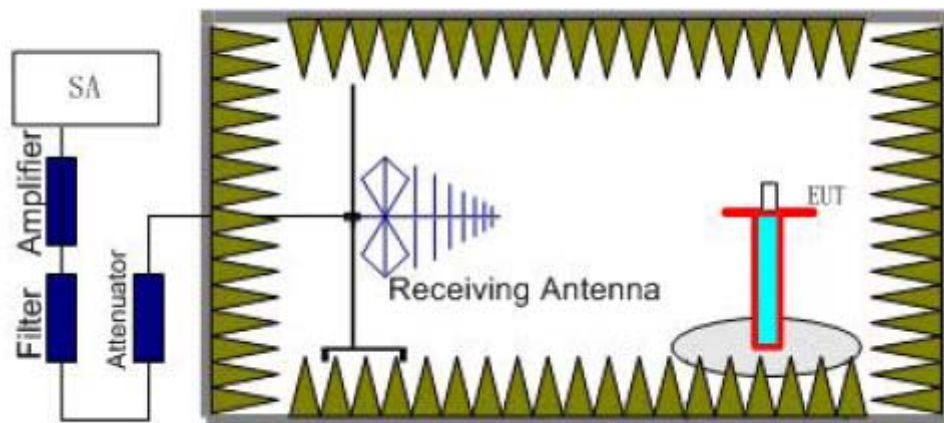
| Voltage (V) | Test Result (ppm) | | |
|-------------|-------------------|-------------|-------------|
| | Channel 128 | Channel 189 | Channel 251 |
| 3.4 | --- | 0.009 | --- |
| 4.2 | --- | 0.006 | --- |

2.2.1.7 Radiated Spurious Emissions-FCC Part2.1053/22.917

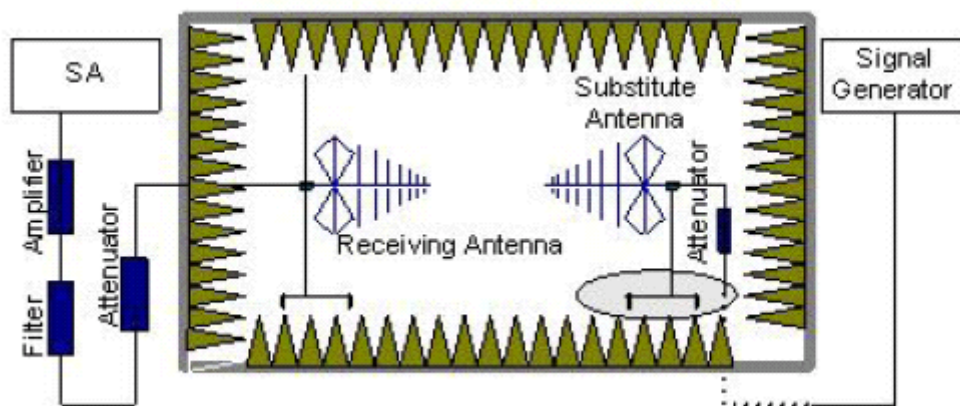
Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

Test Setup:



Step 1



Step 2

Test procedure:

Step 1:

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

established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer or receiver. The spectrum analyzer scans from 30MHz to 20GHz (higher than the 10th harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer. Then the antenna height and turn table rotation is adjusted till the maximum power value is founded on spectrum analyzer or receiver. A notch filter is necessary in the band near to the carrier frequency. A high pass filter is needed to avoid the distortion of the testing equipment in the band above the carrier frequency.

Step 2:

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

Calculation procedure:

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

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

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

Where

P: Power of the Radiated Spurious Emissions (dBm)

P_R: reading of the receiver (dBm)

L_C: Cable Lose (dB)

L_A: Air loss (dB)

G: Antenna Gain (dBi)

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

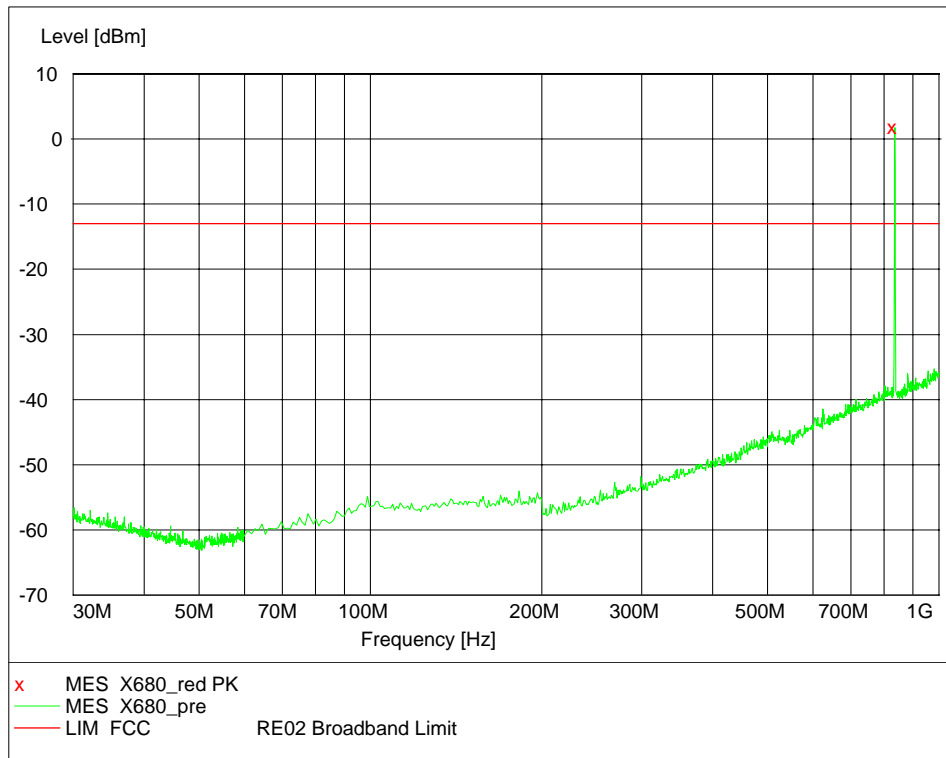
$$P=P_R+L_C+L_A-G=-60+10+30-11=-31dBm$$

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

| | |
|--------|----------|
| Limits | ≤ -13dBm |
|--------|----------|

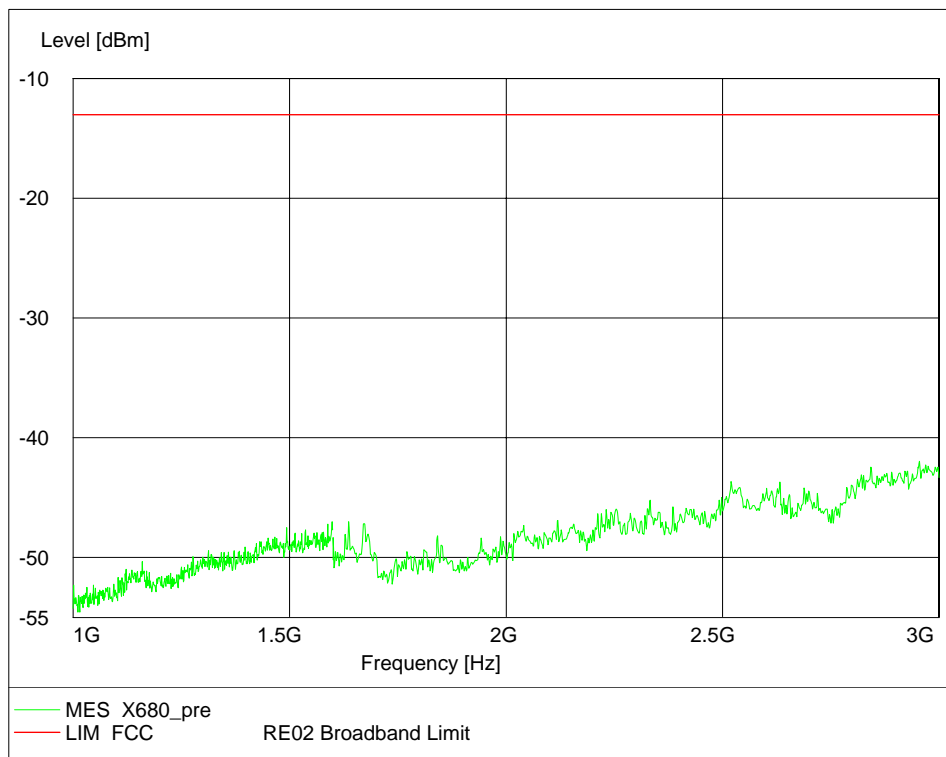
Test result:

Refer to the following figures.
GSM/GPRS MODE:

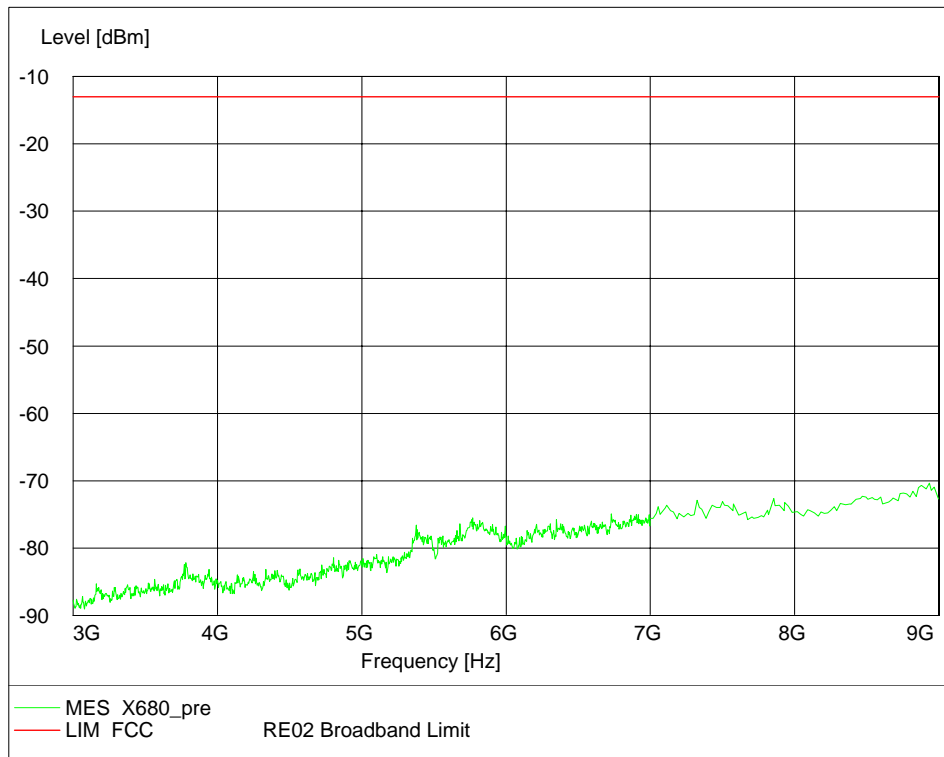


Channel 189, 30MHz~1GHz

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



Channel 189, 1GHz~3GHz



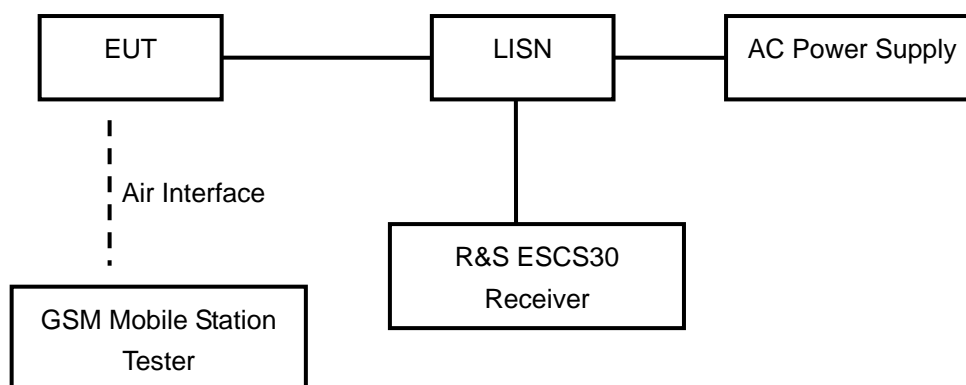
Channel 189, 3GHz~9GHz

2.2.1.8 Conducted Emissions-FCC Part15.107

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

Test Setup:



Test Procedure:

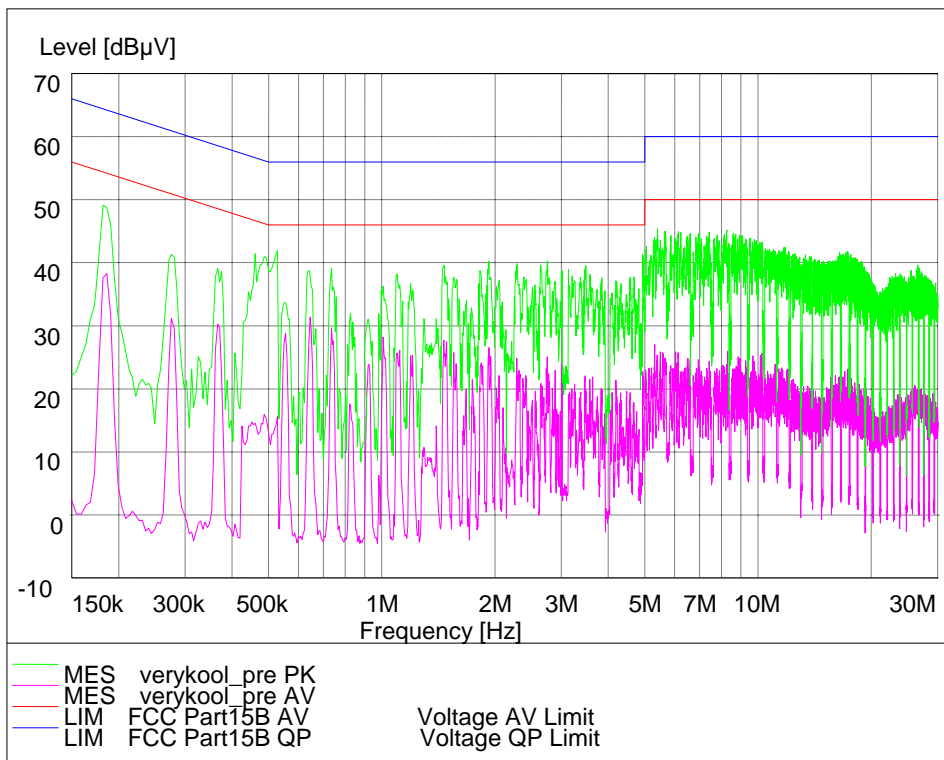
The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The EUT is connected to LISN and LISN is connected to the reference ground. All other supplemental devices are connected with EUT through other LISN. The distance between EUT and LISN is 80cm. The measurement should be done both L line and N line. The receiver uses both average detector and quasi-peak detector. The EUT is worked in idle mode. The output power of the EUT is controlled by the tester and driven to maximum value.

| Frequency of Emission(MHz) | Limits(dB μ V) | |
|----------------------------|--------------------|-----------|
| | Quasi-peak | Average |
| 0.15~0.5 | 66 to 56* | 56 to 46* |
| 0.5~5 | 56 | 46 |
| 5~30 | 60 | 50 |

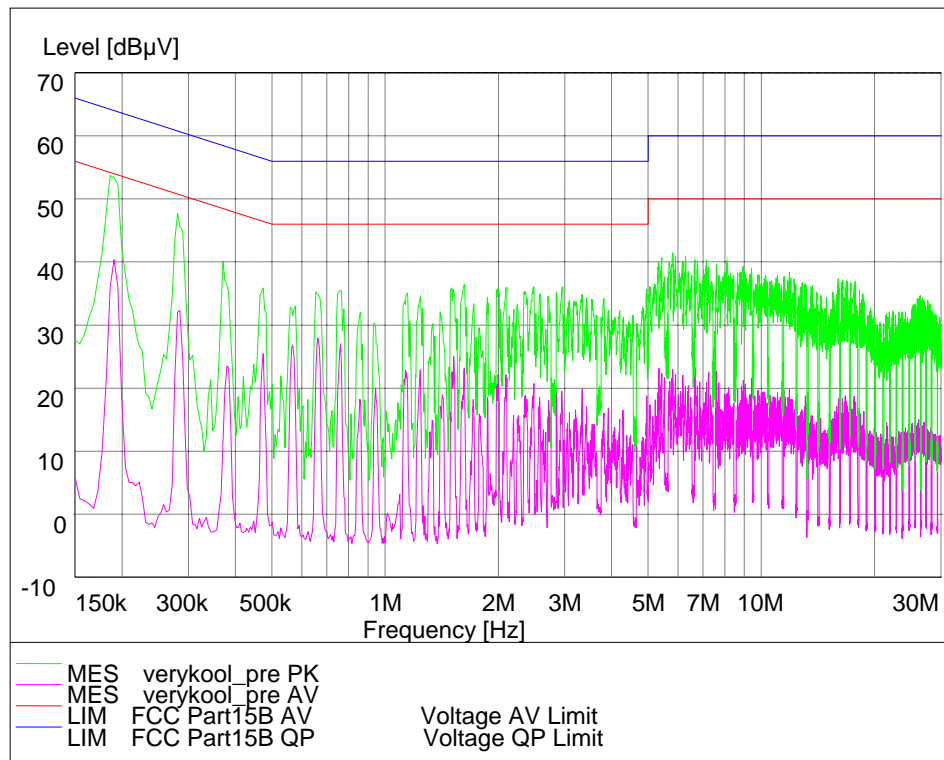
Note: * Decreases with the logarithm of the frequency

Test result:

Refer to the following figures.



L Line



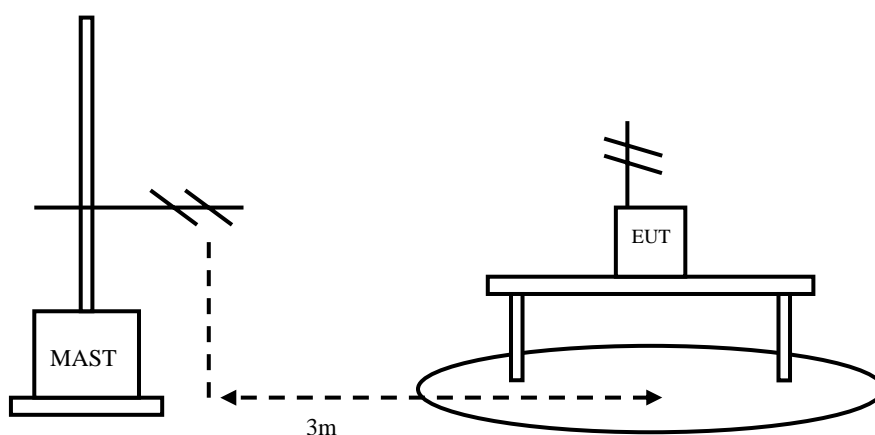
N Line

2.2.1.9 Radiated Emissions -FCC Part15.109

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

Test Setup:



Test Procedure:

The EUT and receive antenna shall be placed to SAC (semi anechoic chamber) upon a non-metallic turn table. The receive antennas shall be moved from 1 to 4 meters. The distance between equipment and receive antenna shall be 3 meters.

Testing shall operate the EUT in idle modes of operation and cable positions in a test set-up which is representative of typical system configurations, as declared by the manufacturer. The output port shall be terminated with 50 ohms.

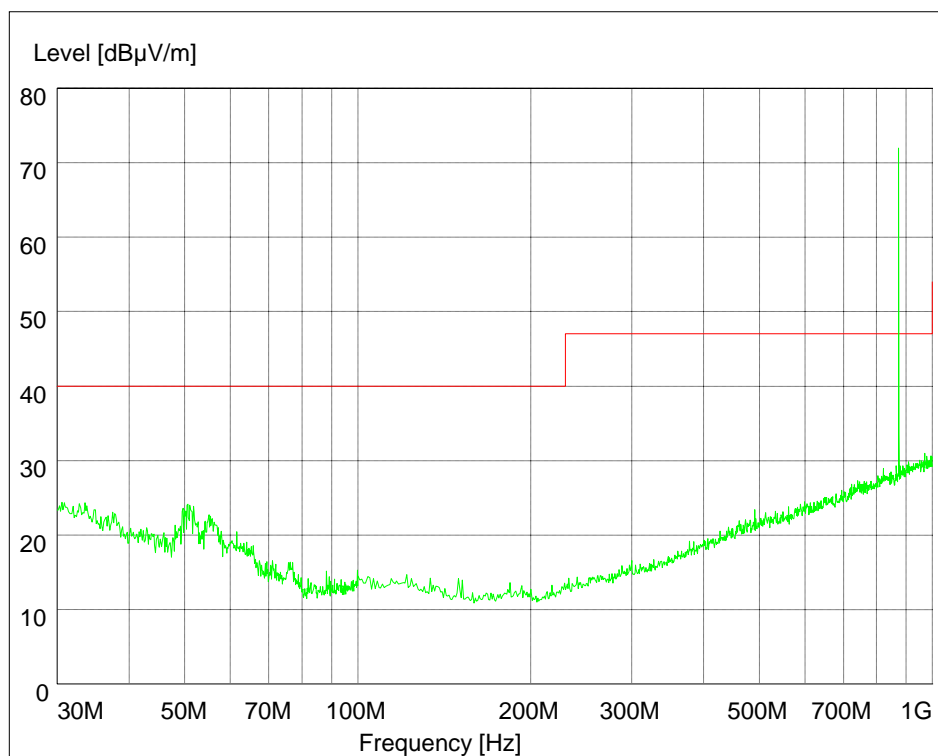
Then start the test software ES-K1. Sweep the whole frequency band through the range from 30MHz to 1GHz, using receive log period antenna HL562.

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

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

| Frequency of Emission(MHz) | Limits | |
|----------------------------|--------------------------------|--|
| | Unit($\mu\text{V}/\text{m}$) | Average($\text{dB}\mu\text{V}/\text{m}$) |
| 30~88 | 100 | 40 |
| 88~216 | 150 | 43.5 |
| 216~960 | 200 | 46 |
| 960~1000 | 500 | 54 |

Test result:
 Refer to the following figures.



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

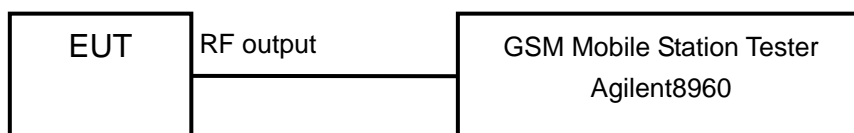
2.2.1 PCS1900

2.2.1.1 RF Power Output –FCC Part2.1046

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

Test Setup:



Test procedure:

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

The measurement will be conducted at three channels No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band)

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

Test result:

GSM/GPRS MODE:

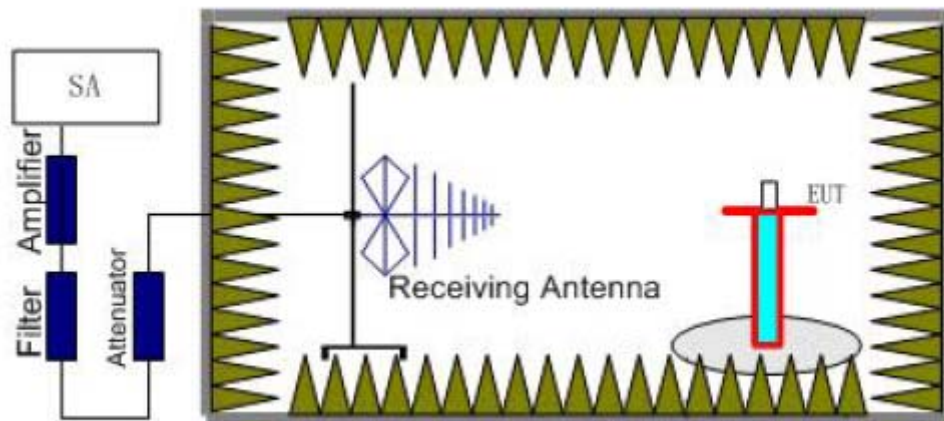
| Carrier frequency (MHz) | Channel No. | RF Power Output (dBm) |
|----------------------------|-------------|--------------------------|
| 1850.2 | 512 | 29.4 |
| 1880.0 | 661 | 29.5 |
| 1909.8 | 810 | 29.6 |

2.2.1.2 Effective Isotropic Radiated Power-FCC Part24.232

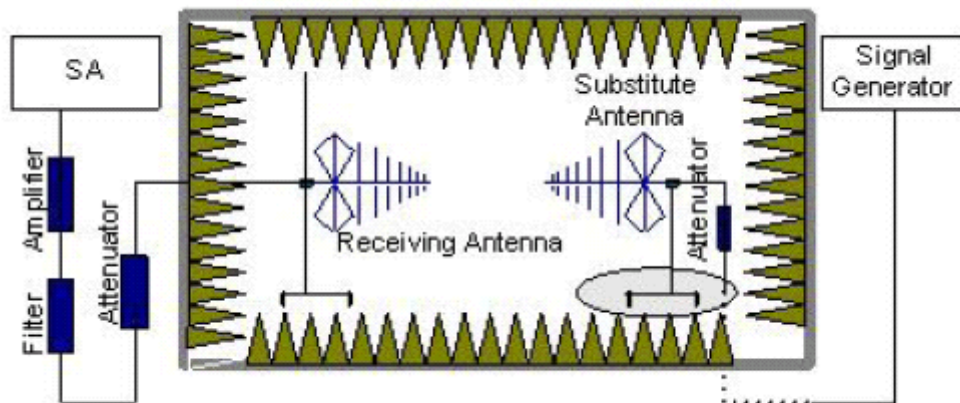
Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

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 No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band)

| | |
|--------|---------------------|
| Limits | $\leq 33\text{dBm}$ |
|--------|---------------------|

Test result:

GSM/GPRS MODE:

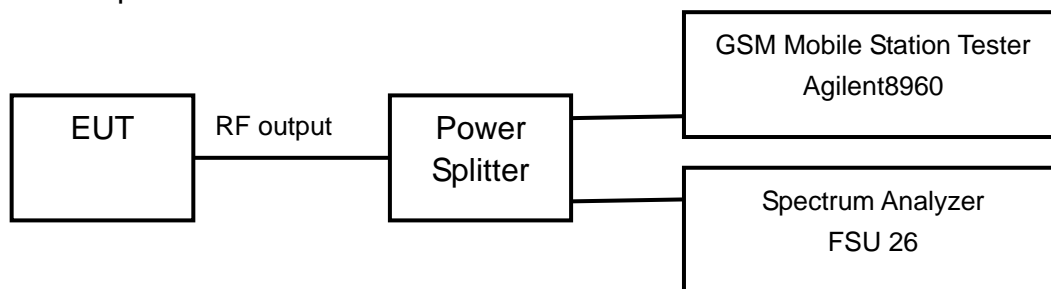
| Carrier frequency (MHz) | Channel No. | E.I.R.P. (dBm) |
|-------------------------|-------------|----------------|
| 1850.2 | 512 | 25.87 |
| 1880.0 | 661 | 24.44 |
| 1909.8 | 810 | 23.70 |

2.2.1.3 Occupied Bandwidth-FCC Part2.1049

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

Test Setup:



Test procedure:

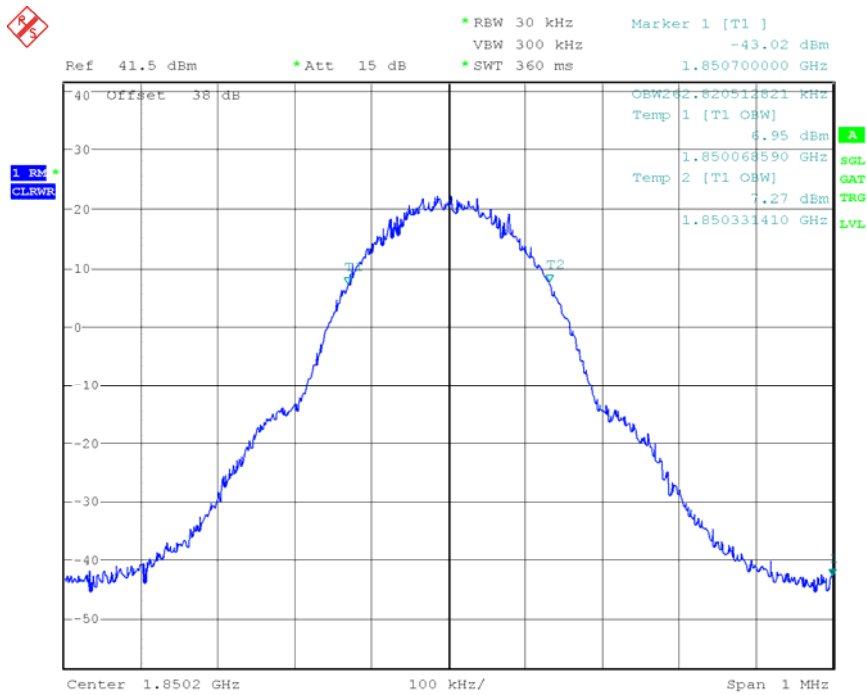
After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The occupied bandwidth is measured using spectrum analyzer. RBW is set to 3kHz on spectrum analyzer. The bandwidth of 99% power can be read on spectrum analyzer. The measurement will be conducted at three channels No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band)

Limits: No specific occupied bandwidth requirements in part 2.1049

Test result:

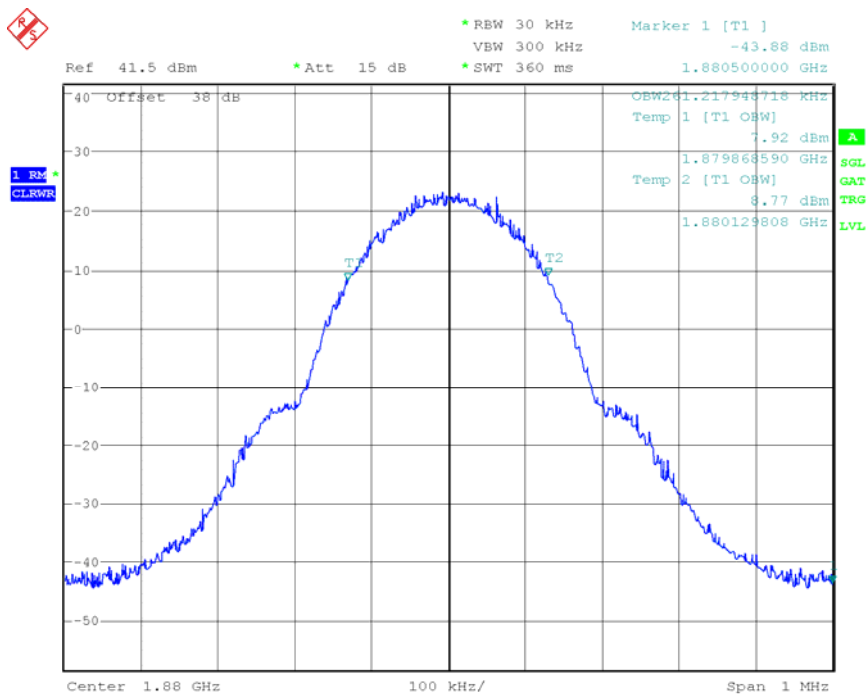
GSM/GPRS MODE:

| Carrier frequency (MHz) | Channel No. | Bandwidth of 99% Power (kHz) |
|-------------------------|-------------|------------------------------|
| 1850.2 | 512 | 262.82 |
| 1880.0 | 661 | 261.22 |
| 1909.8 | 810 | 262.82 |



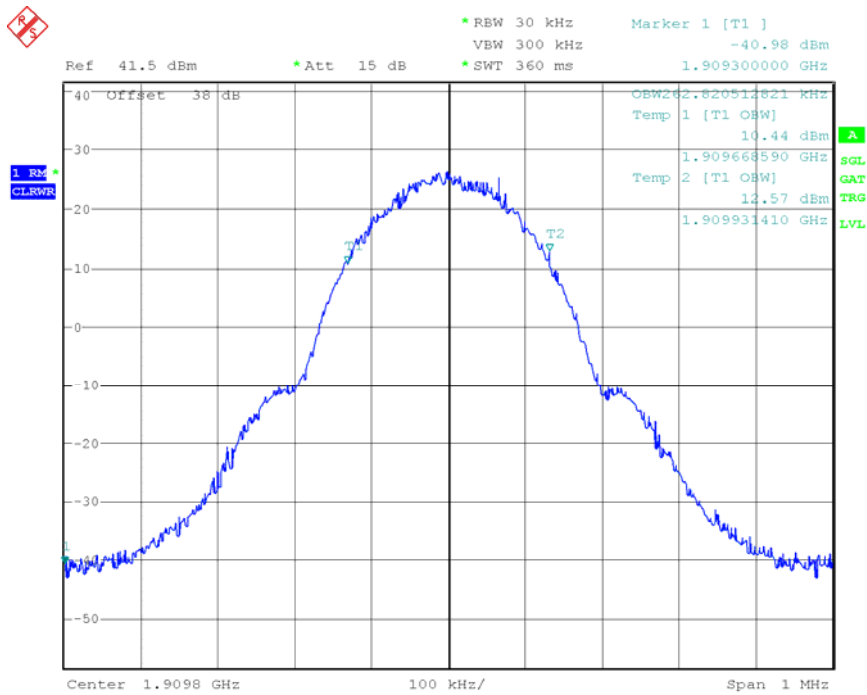
Date: 21.AUG.2008 11:36:20

Channel 512



Date: 21.AUG.2008 11:35:56

Channel 661



Date: 21.AUG.2008 11:35:14

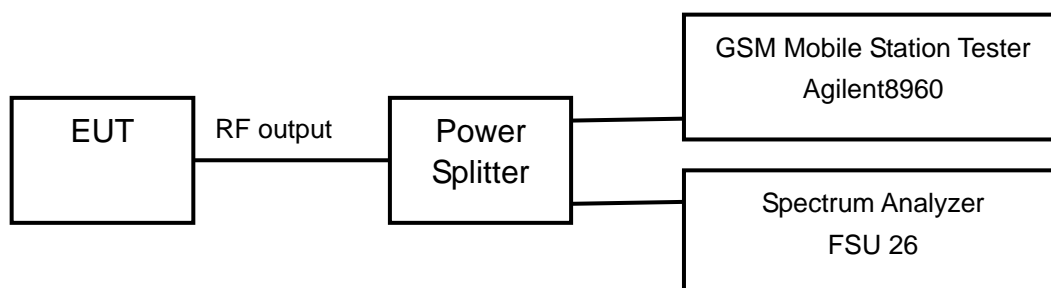
Channel 810

2.2.1.4 Spurious Emissions at antenna terminals-FCC Part2.1051/24.238

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

Test Setup:



Test procedure:

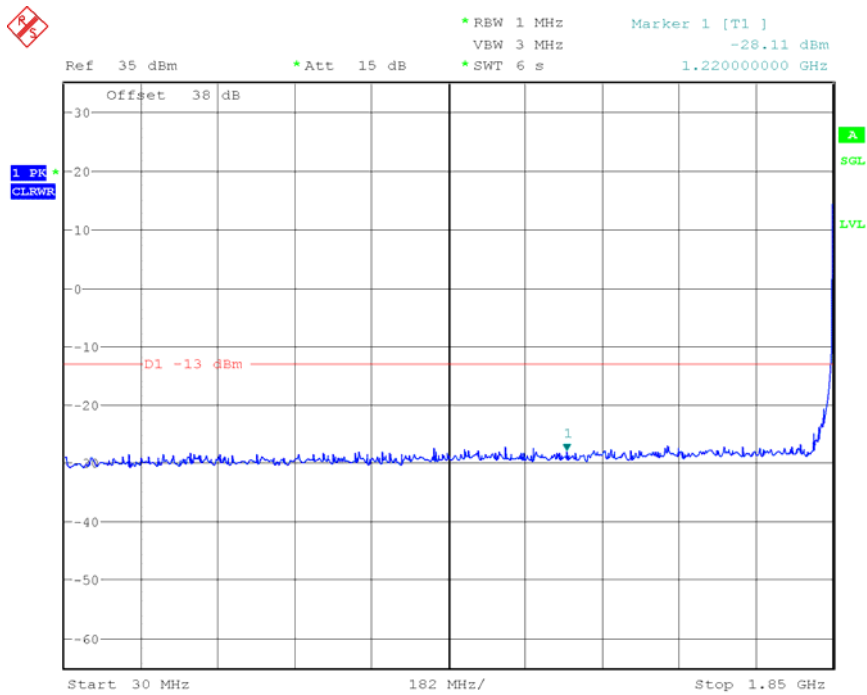
After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to 20GHz (higher than the 10th harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer.

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

| | |
|--------|----------|
| Limits | ≤ -13dBm |
|--------|----------|

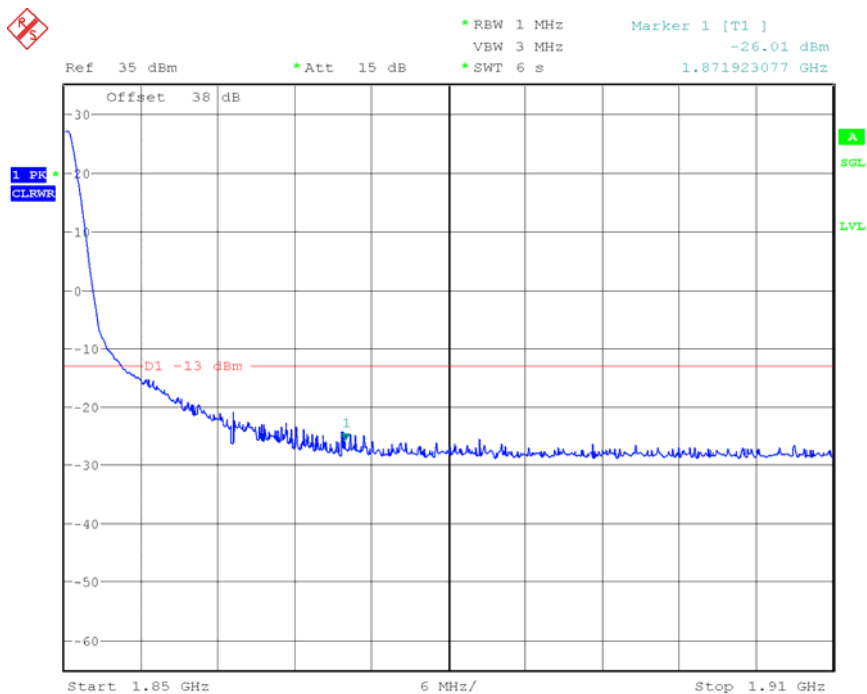
Test result:

Refer to the following figures.



Date: 21.AUG.2008 11:47:41

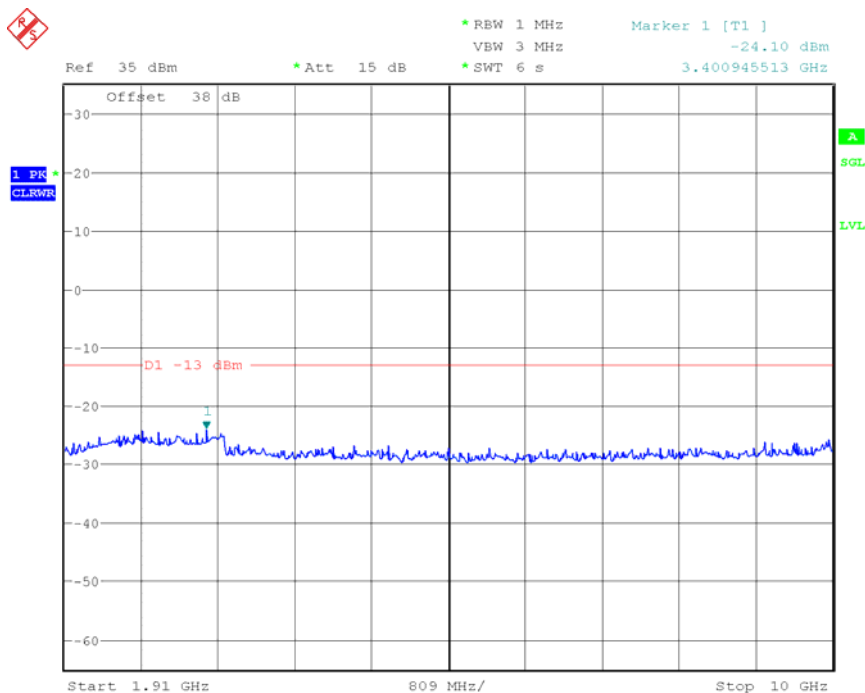
Channel 512, 30MHz~1850MHz



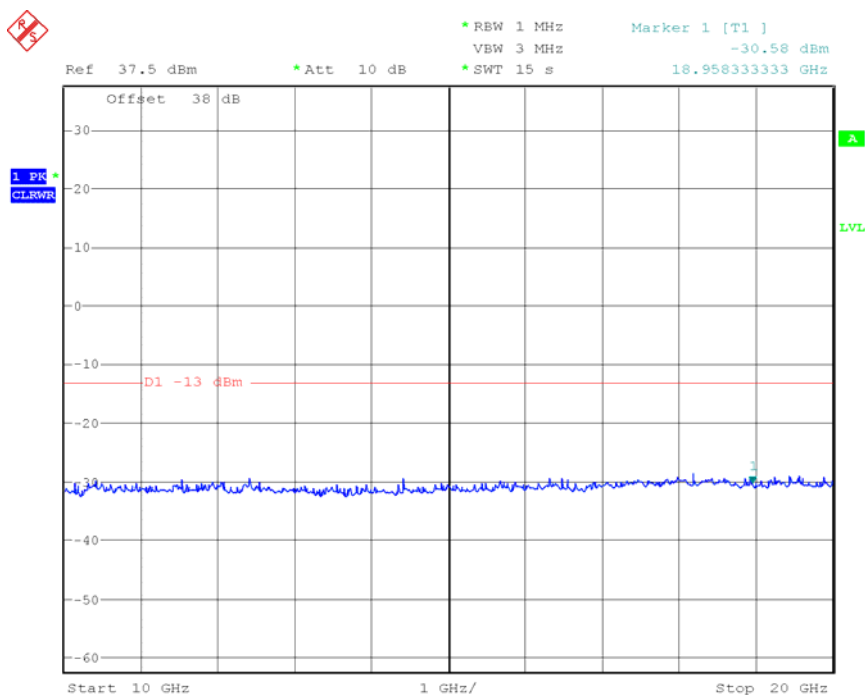
Date: 21.AUG.2008 11:48:10

Channel 512, 1850MHz~1910MHz

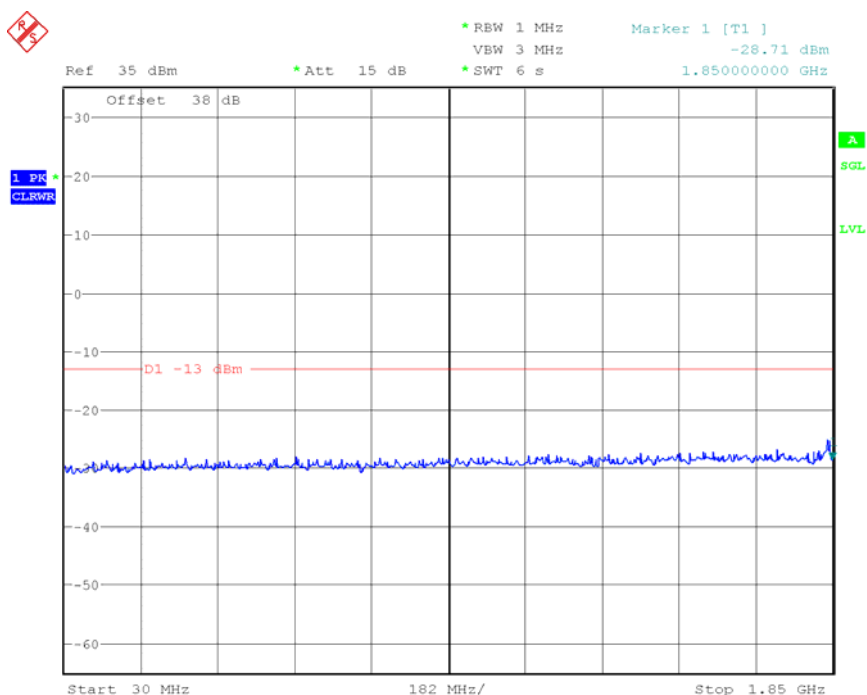
Note: The signal beyond the limit is the base station simulator carrier.



Channel 512, 1910MHz~10GHz

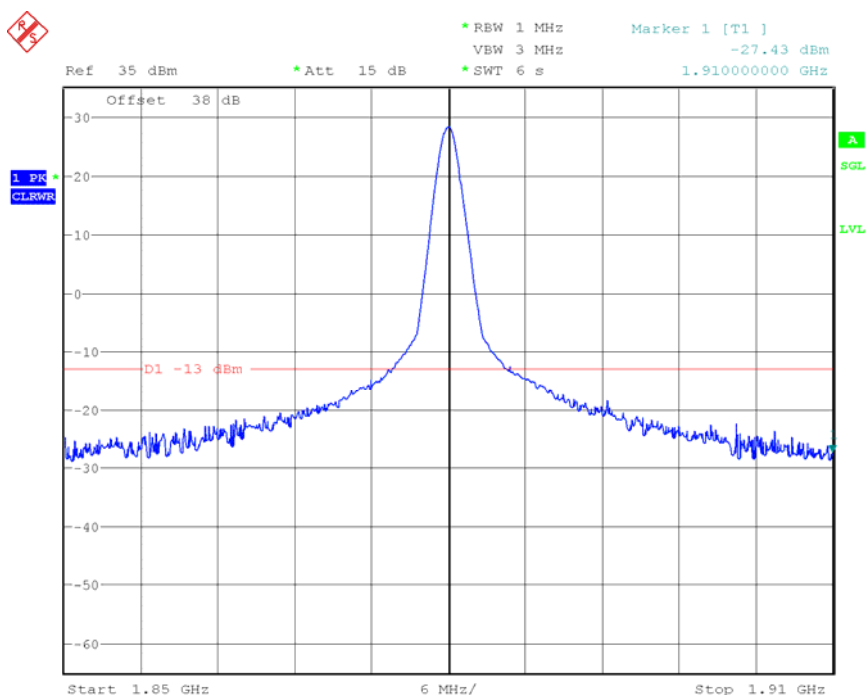


Channel 512, 10GHz~20GHz



Date: 21.AUG.2008 11:47:15

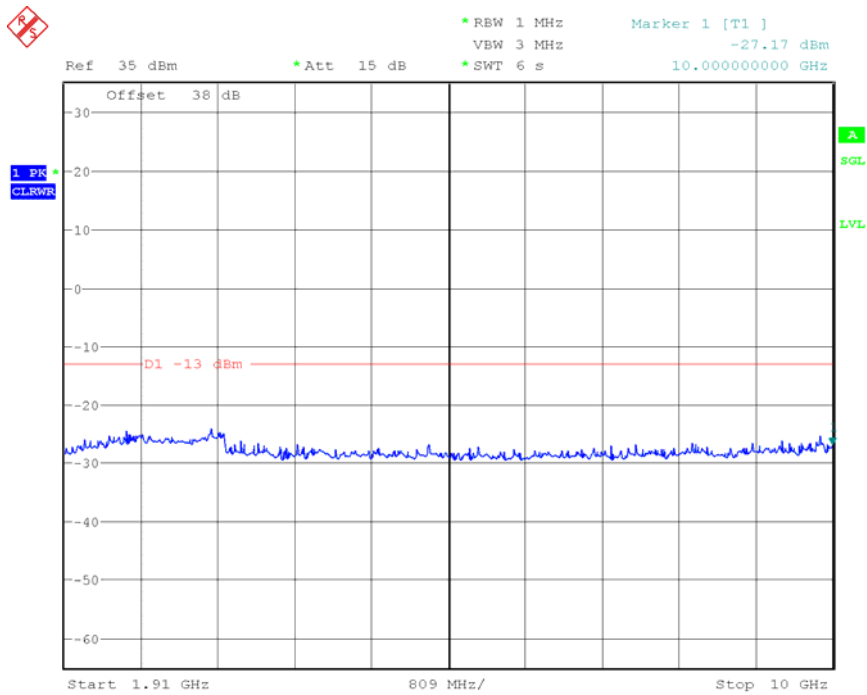
Channel 661, 30MHz~1850MHz



Date: 21.AUG.2008 11:46:43

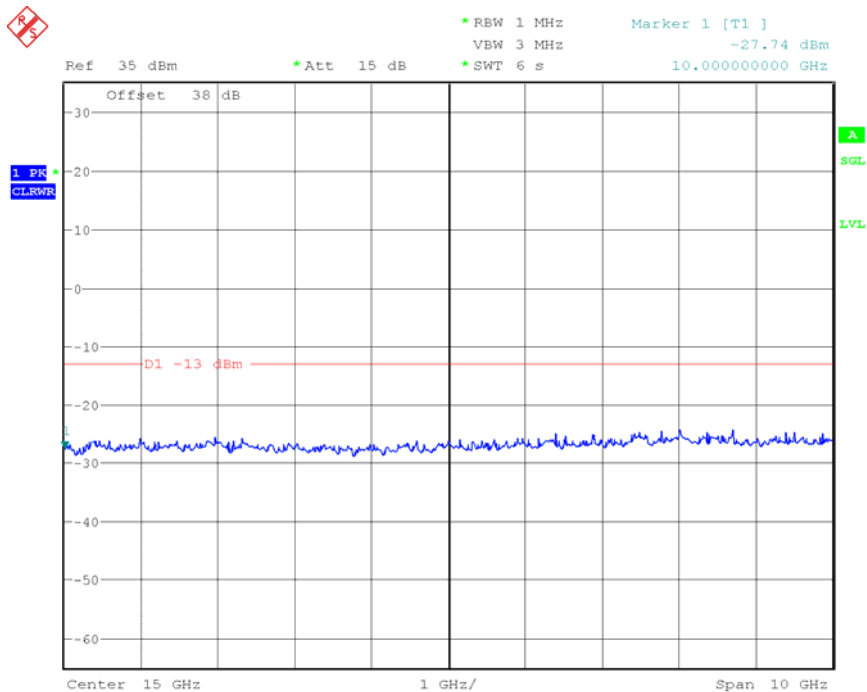
Channel 661, 1850MHz~1910MHz

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



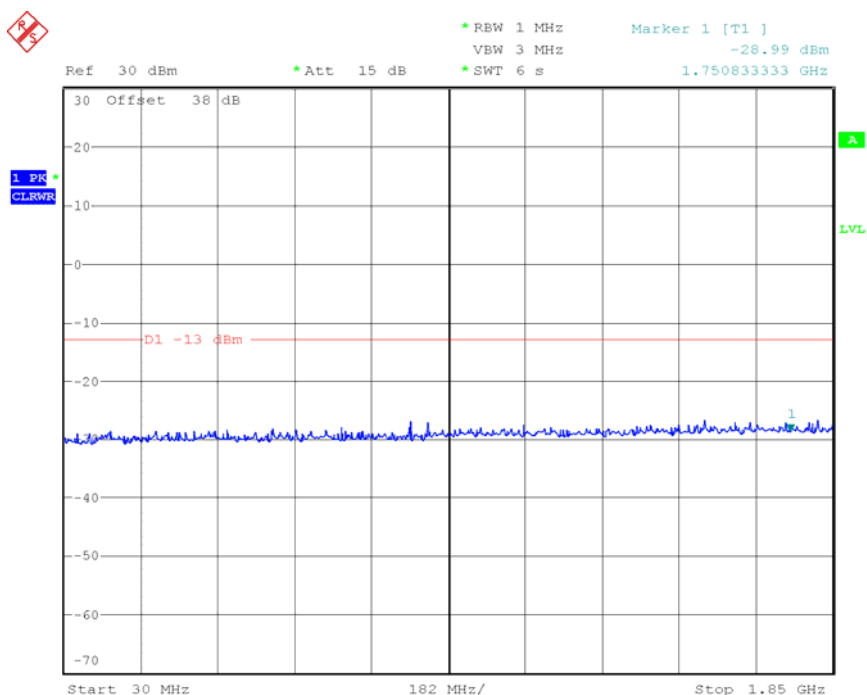
Date: 21.AUG.2008 11:46:21

Channel 661, 1910MHz~10GHz



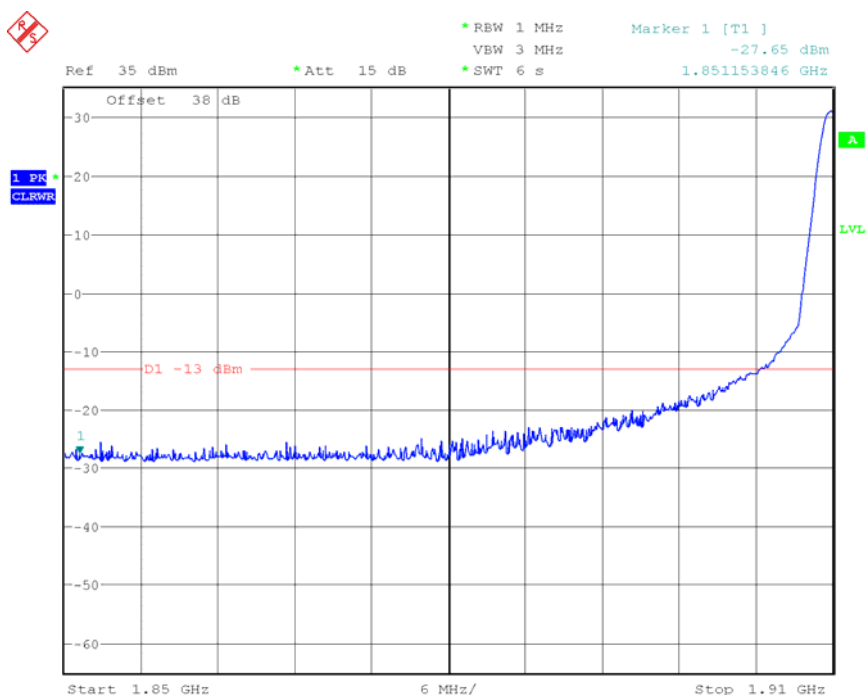
Date: 21.AUG.2008 11:45:55

Channel 661, 10GHz~20GHz



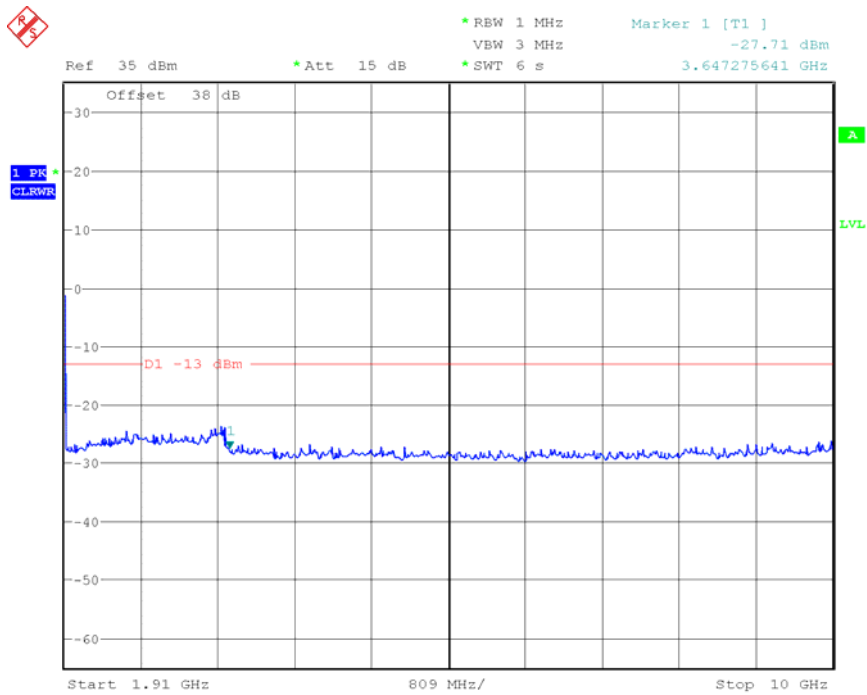
Date: 21.AUG.2008 11:43:26

Channel 810, 30MHz~1850MHz



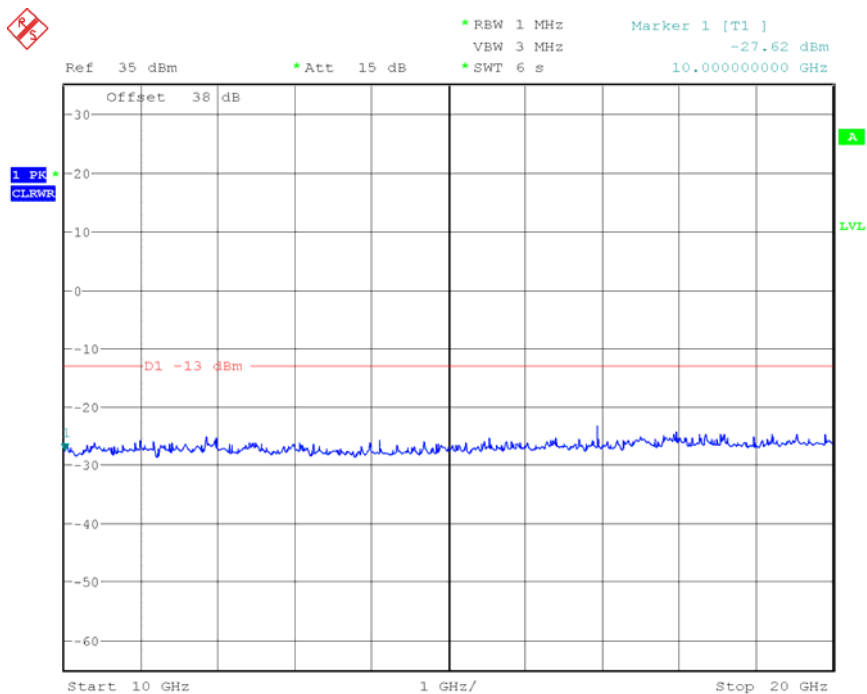
Date: 21.AUG.2008 11:44:11

Channel 810, 1850MHz~1910MHz



Date: 21.AUG.2008 11:45:02

Channel 810, 1910MHz~10GHz



Date: 21.AUG.2008 11:45:33

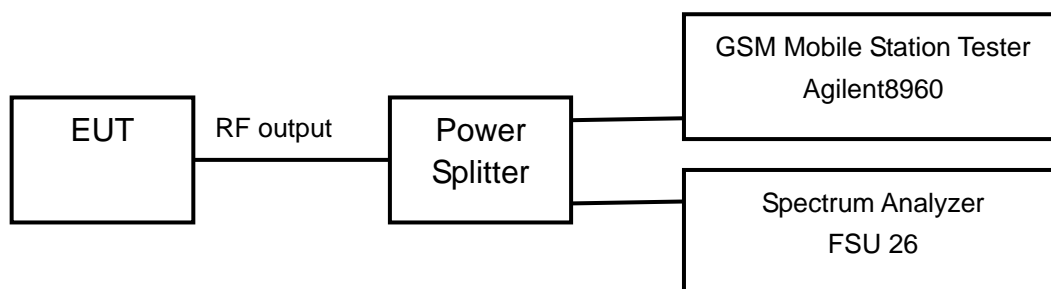
Channel 810, 10GHz~20GHz

2.2.1.5 Band Edges Compliance- FCC Part2.1051/24.238

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

Test Setup:



Test procedure:

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

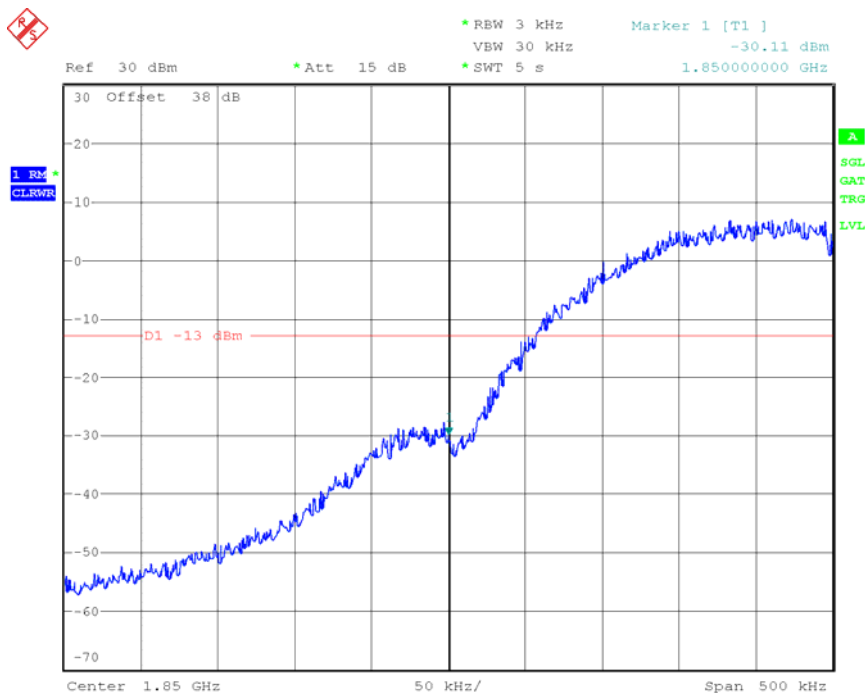
The measurement will be conducted at two channels No512 and No810 (Bottom and top channels of PCS1900 band)

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

Test result:

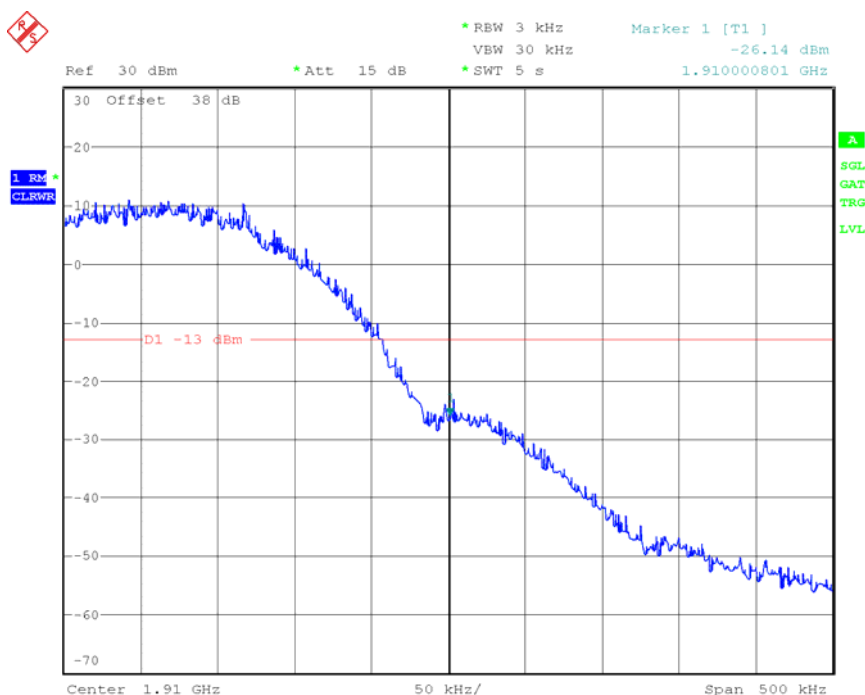
Refer to the following figures.

GSM/GPRS MODE:



Date: 21.AUG.2008 11:39:00

Channel 512



Date: 21.AUG.2008 11:42:06

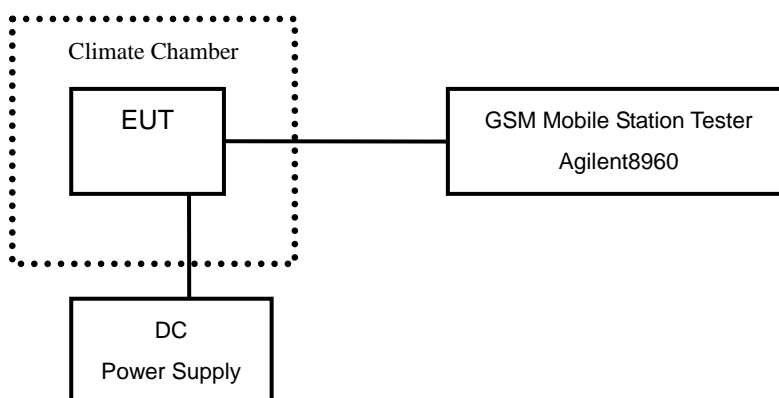
Channel 810

2.2.1.6 Frequency Stability-FCC Part2.1055/Part24.235

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

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 3.4 to 4.2 V.

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

Test Result:

GSM/GPRS MODE:

| Temperature(° C) | Test Result (ppm) | | |
|---------------------|-------------------|-------------|-------------|
| | Channel 512 | Channel 661 | Channel 810 |
| -30 | --- | 0.011 | --- |
| -20 | --- | 0.017 | --- |
| -10 | --- | 0.009 | --- |
| 0 | --- | 0.005 | --- |
| +10 | --- | 0.011 | --- |
| +20 | --- | 0.006 | --- |
| +30 | --- | 0.013 | --- |
| +40 | --- | 0.012 | --- |
| +50 | --- | 0.015 | --- |

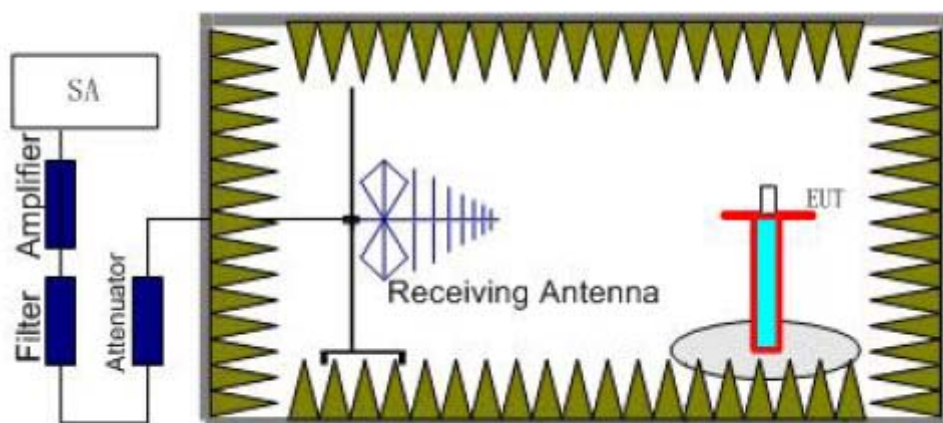
| Voltage (V) | Test Result (ppm) | | |
|-------------|-------------------|-------------|-------------|
| | Channel 512 | Channel 661 | Channel 810 |
| 3.4 | 0.007 | 0.006 | 0.007 |
| 4.2 | 0.012 | 0.014 | 0.008 |

2.2.1.7 Radiated Spurious Emissions-FCC Part2.1053/24.238

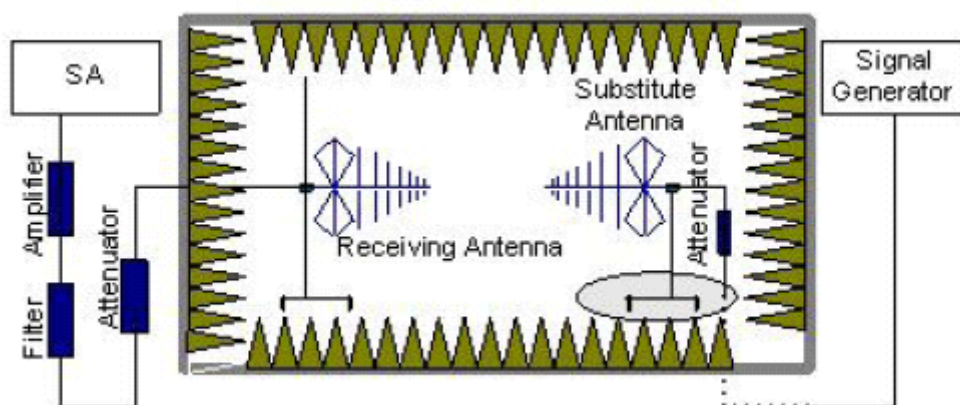
Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

Test Setup:



Step 1



Step 2

Test procedure:

Step 1:

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

established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer or receiver. The spectrum analyzer scans from 30MHz to 20GHz (higher than the 10th harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer. Then the antenna height and turn table rotation is adjusted till the maximum power value is founded on spectrum analyzer or receiver. A notch filter is necessary in the band near to the carrier frequency. A high pass filter is needed to avoid the distortion of the testing equipment in the band above the carrier frequency.

Step 2:

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

Calculation procedure:

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

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

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

Where

P: Power of the Radiated Spurious Emissions (dBm)

P_R: reading of the receiver (dBm)

L_C: Cable Lose (dB)

L_A: Air loss (dB)

G: Antenna Gain (dBi)

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

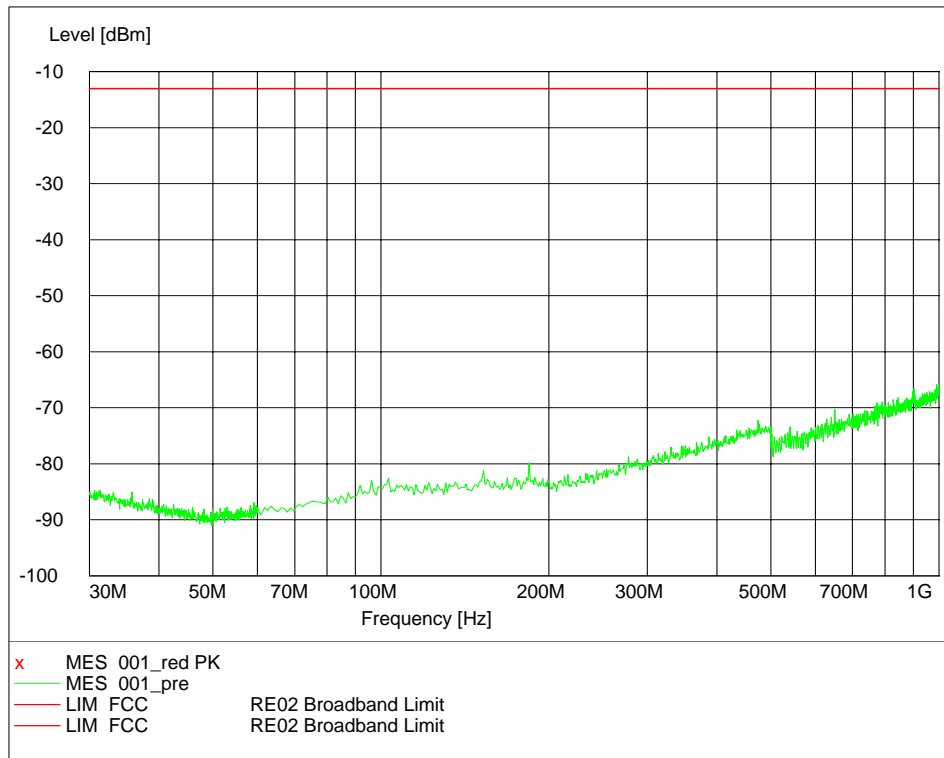
$$P=P_R+L_C+L_A-G=-60+10+30-11=-31dBm$$

The measurement will be conducted at one channel No. 661 (middle channels of PCS1900 band)

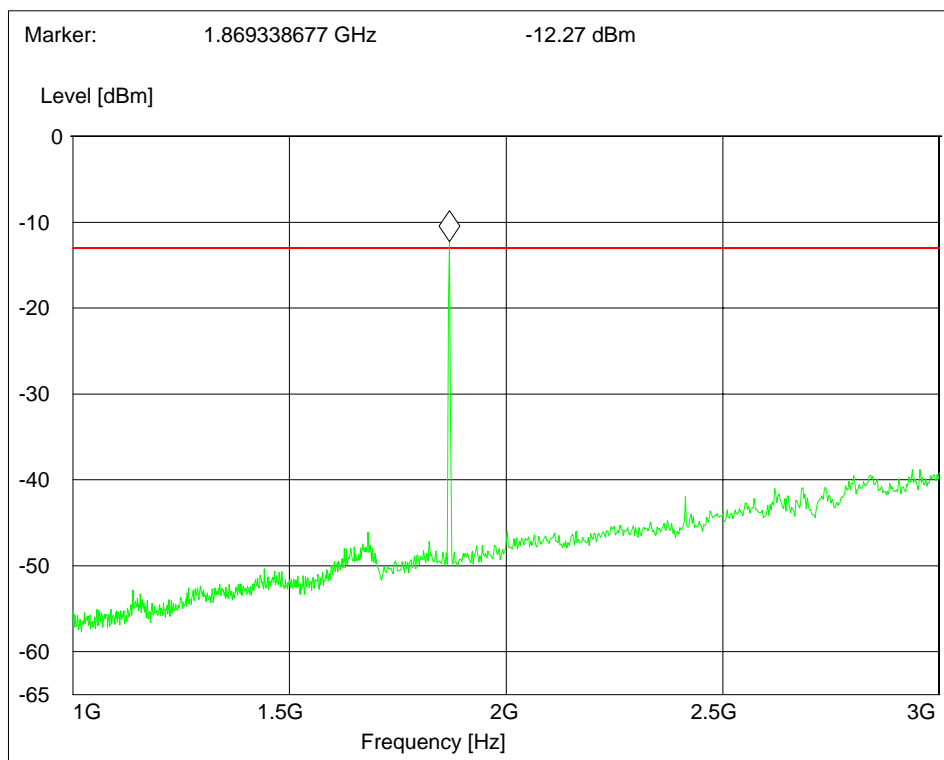
| | |
|--------|----------|
| Limits | ≤ -13dBm |
|--------|----------|

Test result:

Refer to the following figures.

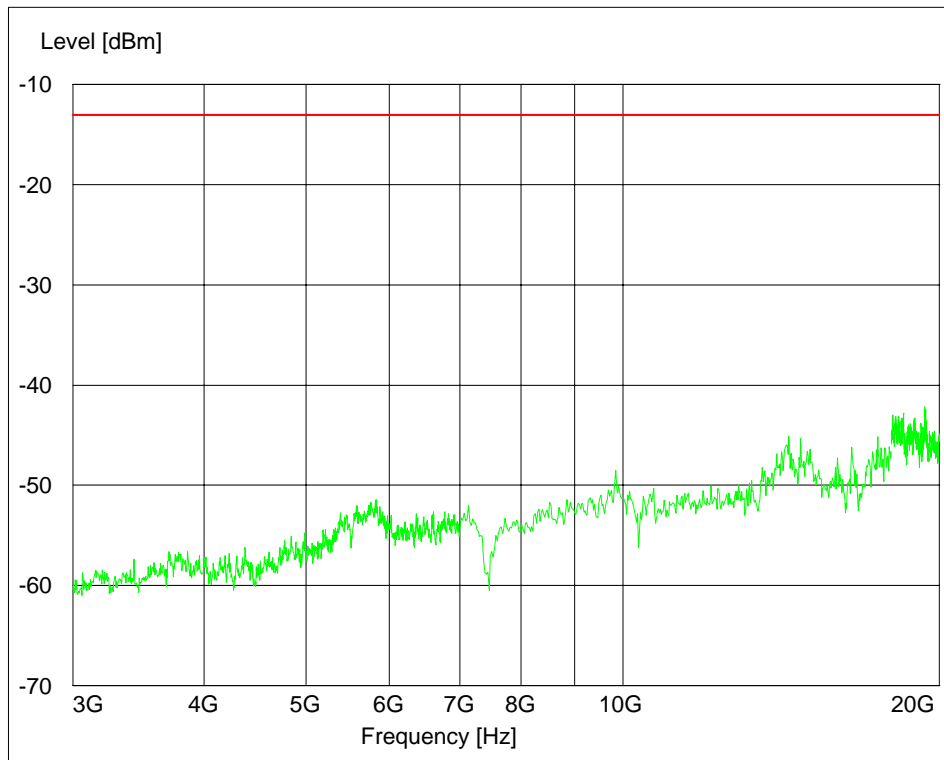


Channel 661, 30MHz~1GHz



Channel 661, 1GHz~3GHz

Note: The signal beyond the limit is the carrier.



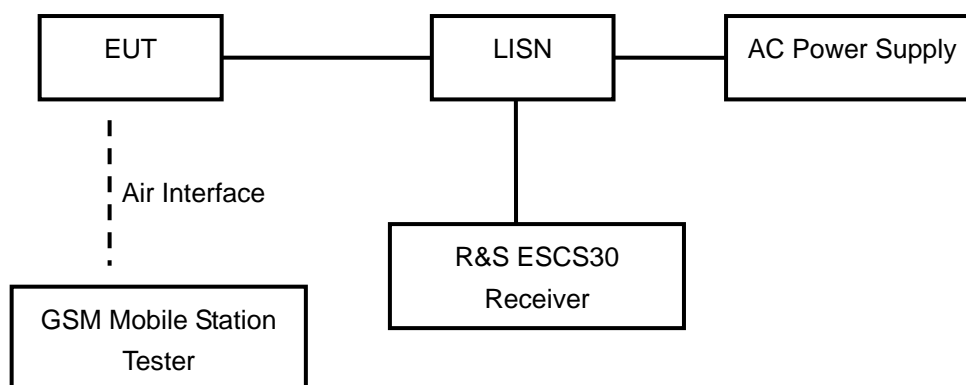
Channel 661, 3GHz~20GHz

2.2.1.8 Conducted Emissions-FCC Part15.107

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

Test Setup:



Test Procedure:

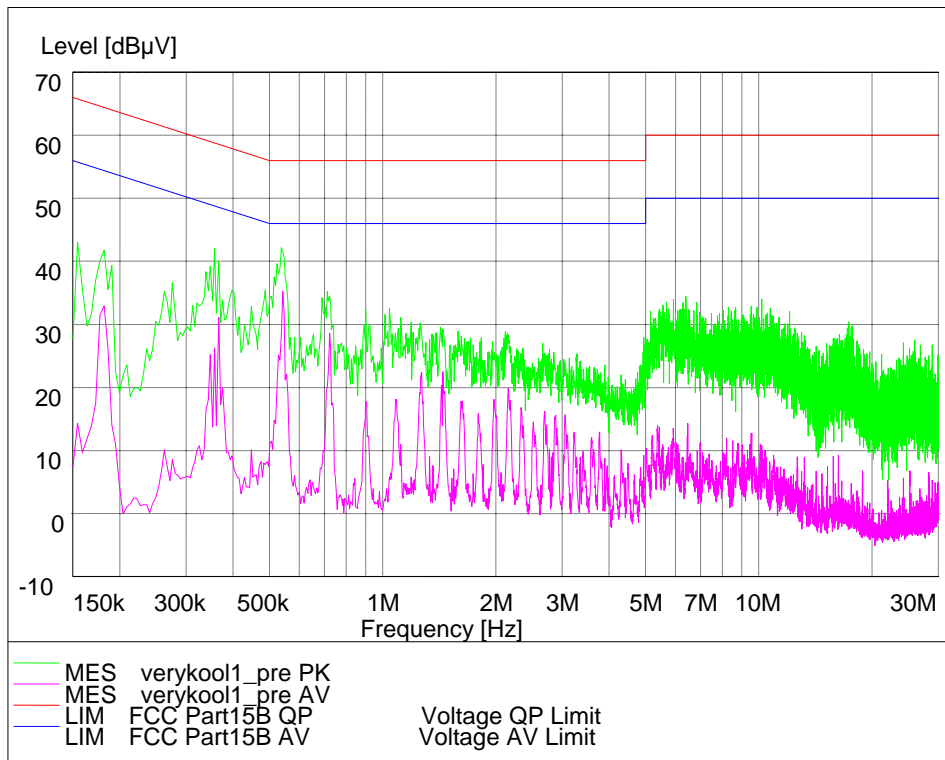
The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The EUT is connected to LISN and LISN is connected to the reference ground. All other supplemental devices are connected with EUT through other LISN. The distance between EUT and LISN is 80cm. The measurement should be done both L line and N line. The receiver uses both average detector and Quasi-peak detector. The EUT is worked in idle mode. The output power of the EUT is controlled by the tester and driven to maximum value.

| Frequency of Emission(MHz) | Limits(dB μ V) | |
|----------------------------|--------------------|-----------|
| | Quasi-peak | Average |
| 0.15~0.5 | 66 to 56* | 56 to 46* |
| 0.5~5 | 56 | 46 |
| 5~30 | 60 | 50 |

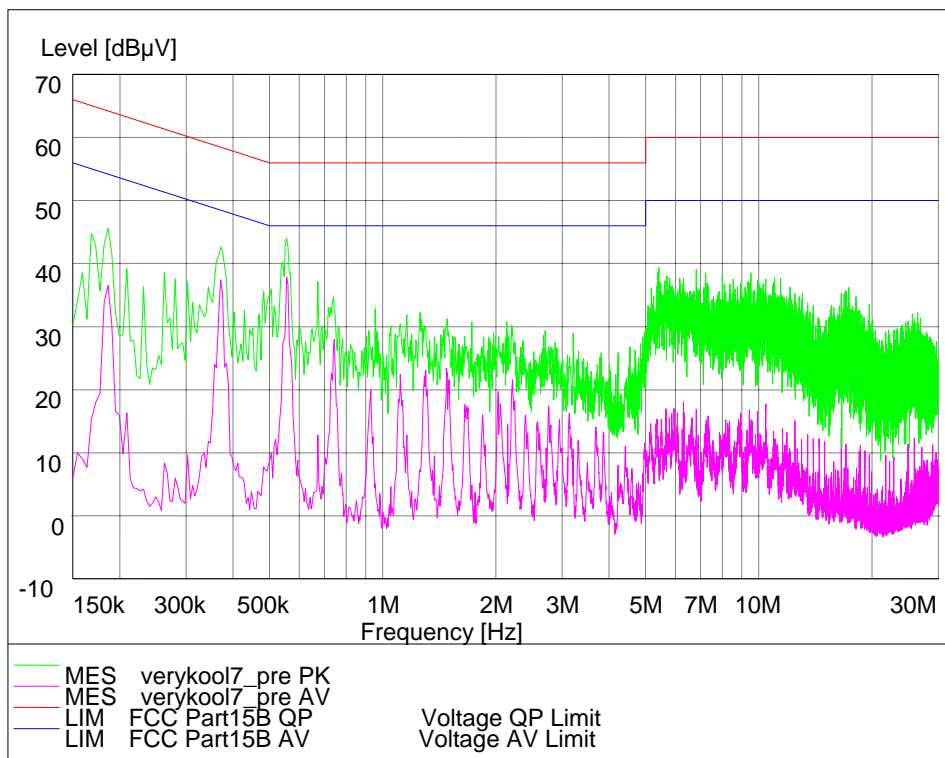
Note: * Decreases with the logarithm of the frequency

Test result:

Refer to the following figures.



L Line



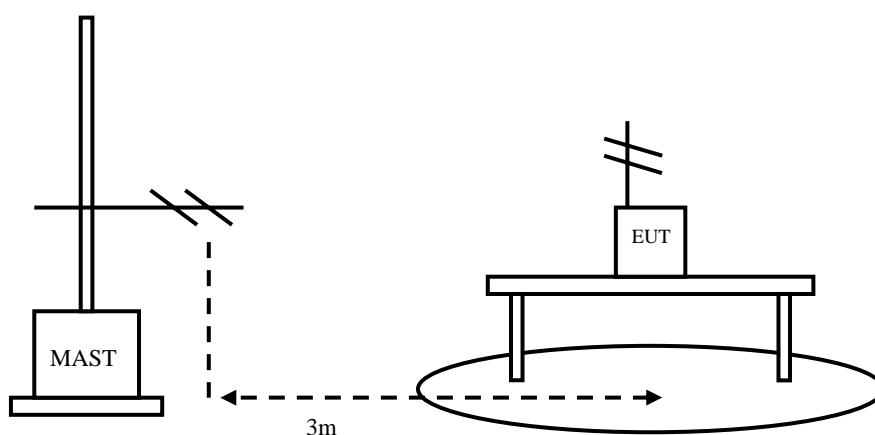
N Line

2.2.1.9 Radiated Emissions -FCC Part15.109

Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 20°C | 54% | 100.5kPa |

Test Setup:



Test Procedure:

The EUT and receive antenna shall be placed to SAC (semi anechoic chamber) upon a non-metallic turn table. The receive antennas shall be moved from 1 to 4 meters. The distance between equipment and receive antenna shall be 3 meters.

Testing shall operate the EUT in idle modes of operation and cable positions in a test set-up which is representative of typical system configurations, as declared by the manufacturer. The output port shall be terminated with 50 ohms.

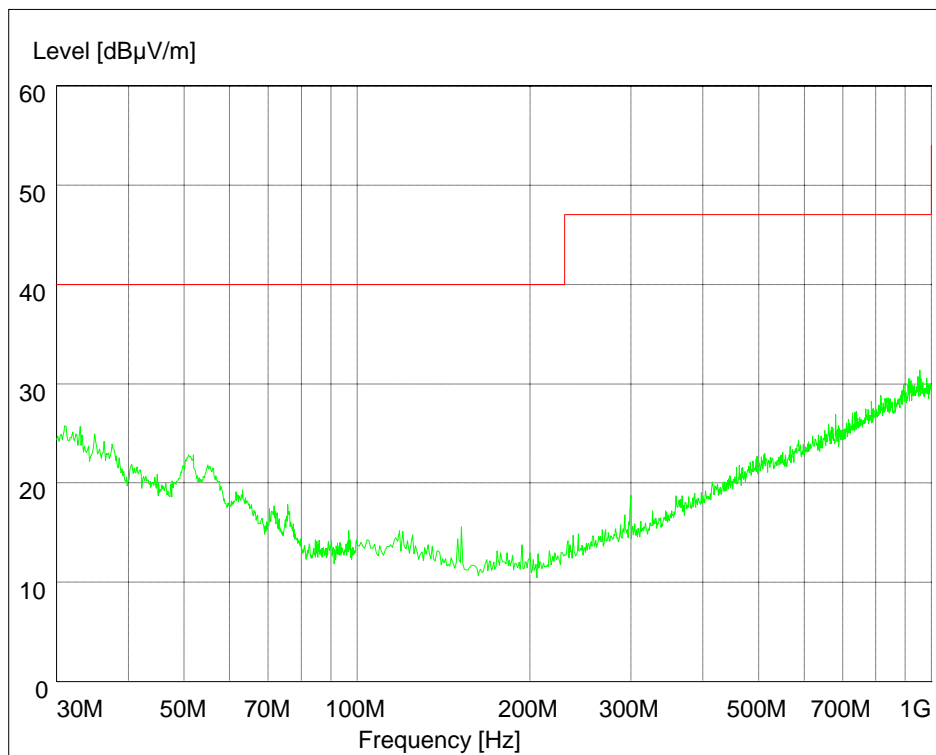
Then start the test software ES-K1. Sweep the whole frequency band through the range from 30MHz to 1GHz, using receive log period antenna HL562.

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

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

| Frequency of Emission(MHz) | Limits | |
|----------------------------|------------------|-----------------------|
| | Unit(μ V/m) | Average(dB μ V/m) |
| 30~88 | 100 | 40 |
| 88~216 | 150 | 43.5 |
| 216~960 | 200 | 46 |
| 960~1000 | 500 | 54 |

Test result:
 Refer to the following figures.



2.3. List of test equipments

| No. | Name/Model | Manufacturer | S/N | Calibration Date |
|-----|---|--------------|-------------|------------------|
| 1 | 8960 E5515C Mobile Station Tester | Agilent | GB44050904 | Mar. 2008 |
| 2 | FSU 26 Spectrum Analyzer | R&S | 100043 | Mar. 2008 |
| 5 | 66309B DC Power Supply | Agilent | MY43000461 | Aug. 2008 |
| 6 | 1506A Power Splitter | Weinschel | MN154 | Aug. 2008 |
| 7 | 9.080m×5.255m×3.525m Shielding room | FRANKONIA | ----- | Aug. 2008 |
| 8 | ESI 40 EMI test receiver | R&S | 100015 | Aug. 2008 |
| 9 | SMR 20 Signal generator | R&S | 100086 | Aug. 2008 |
| 10 | CMU 200 Radio tester | R&S | 100313 | Aug. 2008 |
| 11 | 12.65m*8.03m*7.50m Fully-Anechoic Chamber | FRANKONIA | ----- | Aug. 2008 |
| 12 | HL562 Ultra log test antenna | R&S | 100016 | Aug. 2008 |
| 13 | ESH3-Z2 Pulse limiter | R&S | 10002 | Aug. 2008 |
| 14 | ESH3-Z5 Attenuator | R&S | 100020 | Aug. 2008 |
| 15 | ESH2Z11 LISN | R&S | 50FH-020-10 | Aug. 2008 |
| 16 | CMU 200 Radio tester | R&S | 100313 | Aug. 2008 |
| 17 | HF 906 Double-Ridged Waveguide Horn Antenna | R&S | 100030 | Aug. 2008 |
| 18 | HF 906 Double-Ridged Waveguide Horn Antenna | R&S | 100029 | Aug. 2008 |
| 19 | PS2000 Turn Table | FRANKONIA | ----- | Aug. 2008 |
| 20 | MA260 Antenna Master | FRANKONIA | ----- | Aug. 2008 |
| 21 | SH-241 Climatic Chamber | ESPEC | 92000389 | Aug. 2008 |
| 22 | E5515C Mobile Station Tester | Agilent | GB45071696 | Aug. 2008 |
| 23 | ES-K1 EMI test software | R&S | ----- | Aug. 2008 |
| 24 | HL562 Receive antenna | R&S | 100167 | Aug. 2008 |

Appendix

Appendix1 Test Setup