# EMC TEST REPORT

# No. 130800216SHA-003

| | |
|---|---|
| Applicant | : TCT Mobile Limited<br>5F, C building, No. 232, Liang Jing Road<br>ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203 |
| Manufacturer | : TCL COMMUNICATION TECHNOLOGY HOLDINGS LIMITED<br>70 Huifeng 4rd, ZhongKai Hi-tech Development District, Huizhou,Guangdong 516006 P.R.China |
| Equipment | : one touch H200Y |
| Type/Model | : H200Y-3ATLMX1 |

SUMMARY

The equipment complies with the requirements according to the following standard(s):

**FCC 47CFR Part 22 Subpart H**

**FCC 47CFR Part 24 Subpart E**

Date of issue: November 08, 2013

Prepared by: Reviewed by:

Nemo Li (*Project Engineer*) Daniel Zhao (*Reviewer*)

# Description of Test Facility

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# Content

# 1. General Information

## 1.1 Applicant Information

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|---|---|
| Applicant: | TCT Mobile Limited<br>5F, C building, No. 232, Liang Jing Road<br>ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R.China. 201203 |
| Name of contact: | Zhang Hongmei |
| Tel: | +86 755 36645205 |
| Manufacturer: | TCL COMMUNICATION TECHNOLOGY HOLDINGS LIMITED<br>70 Huifeng 4rd, ZhongKai Hi-tech Development District, Huizhou,Guangdong 516006 P.R.China |
| Sample received date : | August 2, 2013 |
| Date of test : | August 2, 2013 ~ October 15, 2013 |

## 1.2 Identification of the EUT

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|---|---|
| Equipment: | one touch H200Y |
| Type/model: | H200Y-3ATLMX1 |
| FCC ID: | RAD440 |

## 1.3 Technical specification

| | |
|---|---|
| Description of EUT: | This product is a 3G home gateway with high performance, which supports WLAN IEEE 802.11b/g/n, voice call, HSPA, 2 RJ45 interfaces, 1RJ11 interface, and the internal 3G module is used for Internet access. There is an AC/DC adapter with model of S012NU1200100 |
| Gain of Antenna: | Outside dipole antenna: 3.0dBi |
| Rating: | DC 12V powered by<br>AC/DC adapter input AC 100-240V, 50/60Hz, 500mA;<br>Output DC 12V, 1000mA |
| Frequency Range: | The Cellular radiotelephone service and personal communications services frequency ranges of the EUT are as below:<br><br>GSM/GPRS/EDGE 850MHz:<br>Tx: 824.20 - 848.80MHz (at intervals of 200kHz)<br>Rx: 869.20 - 893.80MHz (at intervals of 200kHz)<br><br>GSM/GPRS/EGPRS 1900MHz:<br>Tx: 1850.20 - 1909.80MHz (at intervals of 200kHz)<br>Rx: 1930.20 - 1989.80MHz (at intervals of 200kHz)<br><br>WCDMA/HSDPA/HSUPA 850MHz:<br>Tx: 826.40 - 846.60MHz (at intervals of 200kHz)<br>Rx: 871.40 - 891.60MHz (at intervals of 200kHz)<br><br>WCDMA/HSDPA/HSUPA 1900MHz:<br>Tx: 1852.40 – 1907.60MHz (at intervals of 200kHz)<br>Rx: 1932.40 – 1987.60MHz (at intervals of 200kHz) |

# 2. Test Specification

## 2.1 Instrument list

| Equipment | Type | Manu. | Cal. Date | Due date |
|---|---|---|---|---|
| Test Receiver | ESIB 26 | R&S | 2012-10-21 | 2013-10-20 |
| Semi-anechoic chamber | - | Albatross project | 2013-5-21 | 2014-5-20 |
| Bilog Antenna | CBL 6112D | TESEQ | 2013-5-16 | 2015-5-15 |
| Horn antenna | HF 906 | R&S | 2013-5-13 | 2015-5-12 |
| Pre-amplifier | Pre-amp 18 | R&S | 2013-4-12 | 2014-4-11 |
| Test Receiver | ESCS 30 | R&S | 2012-10-21 | 2013-10-20 |
| A.M.N. | ESH2-Z5 | R&S | 2013-1-9 | 2014-1-8 |
| A.M.N. | ESH3-Z5 | R&S | 2013-1-10 | 2014-1-9 |
| High Pass Filter | WHKX 1.0/15G-10SS | Wainwright | 2013-2-8 | 2014-2-7 |
| High Pass Filter | WHKX 2.8/18G-12SS | Wainwright | 2013-2-8 | 2014-2-7 |
| High Pass Filter | WHKX 7.0/1.8G-8SS | Wainwright | 2013-2-8 | 2014-2-7 |
| Band Reject Filter | WRCGV 2400/2483-2390/2493-35/10SS | Wainwright | 2013-2-8 | 2014-2-7 |
| Test Receiver | FSV40 | R&S | 2012-10-21 | 2013-10-20 |
| Preamplifier | AP-025C | Quietek | 2012-11-25 | 2013-11-24 |
| Preamplifier | AP-180C | Quietek | 2012-11-25 | 2013-11-24 |
| Broad-Band Horn Antenna | BBHA9120D | Schwarzbeck | 2012-11-25 | 2013-11-24 |
| Broad-Band Horn Antenna | BBHA9170 | Schwarzbeck | 2012-11-25 | 2013-11-24 |

## 2.2 Test Standard

FCC Part 22: 2012
FCC Part 24: 2012

## 2.3 Test Summary

**This report applies to tested sample only. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.**

| Test Items | FCC Section | Results | Details see section |
|---|---|---|---|
| Channels for Cellular and Broadband PCS Services | 22.905<br>24.229 | Pass | 4.1 |
| RF Output Power | 2.1046<br>22.913<br>24.232 | Pass | 4.3 |
| Occupied Bandwidth | 2.1049 | Pass | 4.4 |
| Spurious Emissions at Antenna Terminals | 2.1051<br>2.1057<br>22.917<br>24.238 | Pass | 4.5 |
| Power of Spurious Emissions | 2.1053<br>2.1057<br>22.917<br>24.238 | Pass | 4.6 |
| Blockedge at antenna terminal | 22.917<br>24.238 | Pass | 4.7 |
| Frequency Stability | 2.1055<br>22.355<br>24.235 | Pass | 4.8 |
| RF Exposure | 1.1307<br>2.1093 | Pass | 4.9 |

## 3.0 Test Results

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels).Configuration photographs and data tables of the emissions are included.

### 3.1 Channels for Cellular and Broadband PCS Services (FCC Part 22.905, Part 24.229)

The following frequency bands are allocated for assignment to service providers in the Cellular Radiotelephone and Broadband PCS Services by FCC:

850MHz band
(a) Channel Block A:
869 - 880 MHz paired with 824 - 835 MHz
890 - 891.5 MHz paired with 845 - 846.5 MHz
(b) Channel Block B:
880 - 890 MHz paired with 835 - 845 MHz
891.5 - 894 MHz paired with 846 - 849 MHz

1900MHz band
The following frequency blocks are available for assignment on a Major Trading Areas (MTA) basis:
Block A: 1850 - 1865 MHz paired with 1930 - 1945 MHz; and
Block B: 1870 - 1885 MHz paired with 1950 - 1965 MHz.

The following frequency blocks are available for assignment on a Basic Trading Areas (BTA) basis:
Block C: 1895 - 1910 MHz paired with 1975 - 1990 MHz
Block D: 1865 - 1870 MHz paired with 1945 - 1950 MHz
Block E: 1885 - 1890 MHz paired with 1965 - 1970 MHz
Block F: 1890 - 1895 MHz paired with 1970 - 1975 MHz

The frequency range of the EUT is as below:

GSM/GPRS/EDGE 850MHz:
Tx: 824.20 - 848.80MHz (at intervals of 200kHz)
Rx: 869.20 - 893.80MHz (at intervals of 200kHz)

GSM/GPRS/EGPRS 1900MHz:
Tx: 1850.20 - 1909.80MHz (at intervals of 200kHz)
Rx: 1930.20 - 1989.80MHz (at intervals of 200kHz)

WCDMA/HSDPA/HSUPA 850MHz:
Tx: 826.40 - 846.60MHz (at intervals of 200kHz)
Rx: 871.40 - 891.60MHz (at intervals of 200kHz)

WCDMA/HSDPA/HSUPA 1900MHz:
Tx: 1852.40 – 1907.60MHz (at intervals of 200kHz)
Rx: 1932.40 – 1987.60MHz (at intervals of 200kHz)

As a result, the frequency range of the EUT fits into the allocated frequency blocks

### 3.2 RF Power Output (FCC Part 2.1046, 22.913 & 24.232)

The RF power output is measured at the RF output terminal. The limit is as follows:
Part 22.913 (for 850MHz band):

[ ] ≤ 500W ERP (57dBm) for base stations and cellular repeaters
[ √ ] ≤ 7W ERP (38.5dBm) for mobile and auxiliary test transmitters

Part 24.232 (for 1900MHz band):

[ ] ≤ 1640W e.i.r.p. (62.1dBm) for base stations up to 300m HAAT;
[ √ ] ≤ 2W e.i.r.p. (33dBm) peak output power for portable mobile

Test Procedures:

1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.
   The path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure the maximum burst power for GSM and maximum power for other modulation signal.

Test results:

| Band | ARFCN | Frequency (MHz) | Antenna Gain (dBi) | Measured output power (dBm) | *ERP (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|---|
| GSM 850MHz | 190 | 836.6 | 3.00 | 32.27 | 33.12 | 38.5 | Pass |
| GPRS 850MHz | 190 | 836.6 | 3.00 | 32.07 | 32.92 | 38.5 | Pass |
| EGPRS 850MHz | 190 | 836.6 | 3.00 | 26.72 | 27.57 | 38.5 | Pass |
| WCDMA 850MHz | 4183 | 836.6 | 3.00 | 22.46 | 23.31 | 38.5 | Pass |
| HSDPA 850MHz | 4183 | 836.6 | 3.00 | 20.33 | 21.18 | 38.5 | Pass |
| HSUPA 850MHz | 4183 | 836.6 | 3.00 | 20.30 | 21.15 | 38.5 | Pass |

| Band | ARFCN | Frequency (MHz) | Antenna Gain (dBi) | Measured output power (dBm) | #EIRP (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|---|
| GSM 1900MHz | 661 | 1880.0 | 3.00 | 29.76 | 32.76 | 33.0 | Pass |
| GPRS 1900MHz | 661 | 1880.0 | 3.00 | 29.43 | 32.43 | 33.0 | Pass |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| EGPRS 1900MHz | 661 | 1880.0 | 3.00 | 25.98 | 28.98 | 33.0 | Pass |
| WCDMA 1900MHz | 9400 | 1880.0 | 3.00 | 22.92 | 25.92 | 33.0 | Pass |
| HSDPA 1900MHz | 9400 | 1880.0 | 3.00 | 21.50 | 24.50 | 33.0 | Pass |
| HSUPA 1900MHz | 9400 | 1880.0 | 3.00 | 21.40 | 24.40 | 33.0 | Pass |

*ERP (dBm) = Conducted Power (dBm) + Antenna Gain (dBi) - 2.15dB
#EIRP (dBm) = Conducted Power (dBm) + Antenna Gain (dBi)
Remark: RMS detector was used for output power measurement.
RBW: 1MHz and VBW: 3MHz were used when testing the GSM/GPRS/EGPRS mode.
RBW: 10MHz and VBW: 10MHz were used when testing the WCDMA/HSDPA/HSUPA mode.

### 3.3 Occupied Bandwidth (FCC Part 2.1049)

From 2.1049, occupied bandwidth is defined as the measured spectral width of an emission. The measurement determines occupied bandwidth as the difference between upper and lower frequencies where 0.5% of the emission power is above the upper frequency and 0.5% of the emission power is below the lower frequency.

The 26dB bandwidth is also recorded to determine the resolution bandwidth used in measurements, as specified in 22.917 and 24.238.

Test Procedures:

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The 99% occupied bandwidth and 26 dB bandwidth of the middle channel for the highest RF powers were measured.

Test results:

| Band | ARFCN | Frequency (MHz) | 99% Bandwidth (kHz) | 26dB Bandwidth (kHz) |
|---|---|---|---|---|
| GSM 850MHz | 190 | 836.6 | 250 | 318 |
| GSM 1900MHz | 661 | 1880.0 | 245 | 306 |
| GPRS 850MHz | 190 | 836.6 | 245 | 312 |
| GPRS 1900MHz | 661 | 1880.0 | 248 | 315 |
| EGPRS 850MHz | 190 | 836.6 | 247 | 314 |
| EGPRS 1900MHz | 661 | 1880.0 | 244 | 322 |
| WCDMA 850MHz | 4183 | 836.6 | 4172 | 4663 |
| WCDMA 1900MHz | 9400 | 1880.0 | 4157 | 4631 |
| HSDPA 850MHz | 4183 | 836.6 | 4169 | 4673 |
| HSDPA 1900MHz | 9400 | 1880.0 | 4176 | 4625 |
| HSUPA 850MHz | 4183 | 836.6 | 4151 | 4619 |
| HSUPA 1900MHz | 9400 | 1880.0 | 4180 | 4606 |

### 3.4 Spurious Emissions at Antenna Terminals (FCC Part 22.1051, 2.1057, 22.917, 24.238)

The conducted spurious emissions are measured from 9kHz up to the 10th harmonic of fundamental emission.

According to 22.917 and 24.238, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) dB, i.e. at or below -13dBm.

Test Procedures:

1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. The RF fundamental frequency should be excluded against the limit line in the Operating frequency band.
6. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)
   = P(W) - [43 + 10log(P) ] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P) ] (dB)
   = -13dBm.

Test results:

| Band | ARFCN | Frequency (MHz) | Verdict |
|---|---|---|---|
| GSM 850MHz | 190 | 836.6 | Pass |
| GSM 1900MHz | 661 | 1880.0 | Pass |
| GPRS 850MHz | 190 | 836.6 | Pass |
| GPRS 1900MHz | 661 | 1880.0 | Pass |
| EGPRS 850MHz | 190 | 836.6 | Pass |
| EGPRS 1900MHz | 661 | 1880.0 | Pass |
| WCDMA 850MHz | 4183 | 836.6 | Pass |
| WCDMA 1900MHz | 9400 | 1880.0 | Pass |
| HSDPA 850MHz | 4183 | 836.6 | Pass |
| HSDPA 1900MHz | 9400 | 1880.0 | Pass |
| HSUPA 850MHz | 4183 | 836.6 | Pass |

| | | | |
|---|---|---|---|
| HSUPA 1900MHz | 9400 | 1880.0 | Pass |

### 3.5 Power of Spurious Emissions (FCC Part 2.1053, 2.1057, 22.917, 24.238)

The radiated spurious emissions are tested per TIA/EIA-603 using the Substitution Method and measured from 9kHz up to the 10th harmonic of fundamental emission. The simultaneous transmission has been considered when perform spurious radiation test.

According to 22.917, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) dB, i.e. at or below -13dBm. The RBW: 100kHz and VBW: 300KHz were used at the 850 band; The RBW: 1MHz and VBW: 3MHz were used at the 1900 band;

Test Procedures:

1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
11. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)
    = P(W) - [43 + 10log(P) ] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P) ] (dB)
    = -13dBm.
12. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
13. ERP (dBm) = EIRP - 2.15

Test results:

GSM 850MHz (ARFCN = 190, Channel frequency = 836.6MHz):

| Polarization | Frequency (MHz) | Measured ERP (dBm) | Limit ERP (dBm) | Margin (dB) |
|---|---|---|---|---|
| V | 1672.8 | -42.14 | -13 | -29.14 |

GSM 1900MHz (ARFCN = 661, Channel frequency = 1880.0MHz):

| Polarization | Frequency (MHz) | Calculated EIRP (dBm) | Limit EIRP (dBm) | Margin (dB) |
|---|---|---|---|---|
| V | 3760.0 | -47.90 | -13 | -34.90 |

GPRS 850MHz (ARFCN = 190, Channel frequency = 836.6MHz):

| Polarization | Frequency (MHz) | Measured ERP (dBm) | Limit ERP (dBm) | Margin (dB) |
|---|---|---|---|---|
| V | 1672.8 | -45.95 | -13 | -32.95 |

GPRS 1900MHz (ARFCN = 661, Channel frequency = 1880.0MHz):

| Polarization | Frequency (MHz) | Calculated EIRP (dBm) | Limit EIRP (dBm) | Margin (dB) |
|---|---|---|---|---|
| V | 3760.0 | -47.40 | -13 | -34.40 |

EGPRS 850MHz (ARFCN = 190, Channel frequency = 836.6MHz):

| Polarization | Frequency (MHz) | Measured ERP (dBm) | Limit ERP (dBm) | Margin (dB) |
|---|---|---|---|---|
| V | 1672.8 | -44.05 | -13 | -31.05 |

EGPRS 1900MHz (ARFCN = 661, Channel frequency = 1880.0MHz):

| Polarization | Frequency (MHz) | *Calculated EIRP (dBm) | Limit EIRP (dBm) | Margin (dB) |
|---|---|---|---|---|
| V | 3760 | -45.3 | -13 | -32.3 |

WCDMA 850MHz (ARFCN = 4183, Channel frequency = 836.6MHz):

| Polarization | Frequency (MHz) | Measured ERP (dBm) | Limit ERP (dBm) | Margin (dB) |
|---|---|---|---|---|
| V | 1668.35 | -40.05 | -13 | -26.05 |

WCDMA 1900MHz (ARFCN = 9400, Channel frequency = 1880.0MHz):

| Polarization | Frequency (MHz) | *Calculated EIRP (dBm) | Limit EIRP (dBm) | Margin (dB) |
|---|---|---|---|---|
| V | 3761.5 | -57.6 | -13 | -44.6 |

HSDPA 850MHz (ARFCN = 4183, Channel frequency = 836.6MHz):

| Polarization | Frequency (MHz) | Measured ERP (dBm) | Limit ERP (dBm) | Margin (dB) |
|---|---|---|---|---|
| V | 1668.35 | -39.75 | -13 | -26.75 |

HSDPA 1900MHz (ARFCN = 9400, Channel frequency = 1880.0MHz):

| Polarization | Frequency (MHz) | *Calculated EIRP (dBm) | Limit EIRP (dBm) | Margin (dB) |
|---|---|---|---|---|
| V | 3761.5 | -57.5 | -13 | -44.5 |

HSUPA 850MHz (ARFCN = 4183, Channel frequency = 836.6MHz):

| Polarization | Frequency (MHz) | Measured ERP (dBm) | Limit ERP (dBm) | Margin (dB) |
|---|---|---|---|---|
| V | 1668.35 | -39.95 | -13 | -26.95 |

HSUPA 1900MHz (ARFCN = 9400, Channel frequency = 1880.0MHz):

| Polarization | Frequency (MHz) | *Calculated EIRP (dBm) | Limit EIRP (dBm) | Margin (dB) |
|---|---|---|---|---|
| V | 3761.5 | -57.5 | -13 | -44.5 |

*EIRP = ERP + 2.15dB

Remarks: the magnitudes of spurious emission which are attenuated more than 20 dB below the permissible value are not reported.

### 3.6 Band edge at Antenna Terminals (FCC Part 22.917, 24.238)

In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter is employed. The 26dB emission bandwidth taken in section 4.4 is used for calculating the resolution bandwidth.
The power of any emission at the blockedge must be attenuated below the transmitting power (P) by a factor of at least 43 +10 Log (P) dB, i.e. at or below -13dBm when using 1% emissions bandwidth.

According to the FCC KDB with Publication Number: 890810, measurements using narrower resolution bandwidths are acceptable and must sum the power from all contiguous reduced resolution bandwidths within the 1% resolution specified, an alternative is to add an additional correction factor of 10 Log (RBW1/ RBW2) to the 43 +10 Log (P) limit. RBW1 is the narrower measurement resolution bandwidth and RBW2 is the 1% emissions bandwidth.

Test Procedures:

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.
   The path loss was compensated to the results for each measurement.
3. The band edges of low and high channels for the highest RF powers were measured.
4. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
5. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)
   = P(W) - [43 + 10log(P) ] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P) ] (dB)
   = -13dBm.

Test results:

| Band | ARFCN | Channel Frequency (MHz) | Worst case bandedge emission with RBW 1KHz(dBm) | Correction Factor (dB) | Worst case bandedge emission with RBW 3.2KHz(dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|---|
| GSM 850MHz | 128 | 824.2 | -18.25 | -5.05 | -13.10 | -13 | PASS |
| | 251 | 848.8 | -18.22 | -5.05 | -13.07 | -13 | PASS |
| GPRS 850MHz | 128 | 824.2 | -19.87 | -5.05 | -14.82 | -13 | PASS |
| | 251 | 848.8 | -19.03 | -5.05 | -13.98 | -13 | PASS |
| EGPRS 850MHz | 128 | 824.2 | -26.75 | -5.05 | -21.70 | -13 | PASS |
| | 251 | 848.8 | -27.46 | -5.05 | -22.41 | -13 | PASS |

Note: The correction factor = 10 Log (RBW1/ RBW2) = 10 Log (1/3.2) = -5.05 dB for GSM 850 Band.

| Band | ARFCN | Channel Frequency (MHz) | Worst case bandedge emission with RBW 3KHz(dBm) | Correction Factor (dB) | Worst case bandedge emission with RBW 3.2KHz(dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|---|
| GSM 1900MHz | 512 | 1850.2 | -17.44 | -0.28 | -17.16 | -13 | PASS |
| | 810 | 1909.8 | -16.98 | -0.28 | -16.70 | -13 | PASS |
| GPRS 1900MHz | 512 | 1850.2 | -18.32 | -0.28 | -18.04 | -13 | PASS |
| | 810 | 1909.8 | -20.02 | -0.28 | -19.74 | -13 | PASS |
| EGPRS1900MHz | 512 | 1850.2 | -21.48 | -0.28 | -21.20 | -13 | PASS |
| | 810 | 1909.8 | -21.10 | -0.28 | -20.82 | -13 | PASS |

Note: The correction factor = 10 Log (RBW1/ RBW2) = 10 Log (3/3.2) = -0.28 dB for GSM 1900 Band.

| Band | ARFCN | Channel Frequency (MHz) | Worst case bandedge emission with RBW 100KHz(dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|
| WCDMA 850MHz | 4132 | 826.4 | -15.90 | -13 | PASS |
| | 4233 | 846.6 | -18.08 | -13 | PASS |
| WCDMA 1900MHz | 9262 | 1852.4 | -17.42 | -13 | PASS |
| | 9538 | 1907.6 | -19.88 | -13 | PASS |
| HSDPA 850MHz | 4132 | 826.4 | -17.45 | -13 | PASS |
| | 4233 | 846.6 | -19.71 | -13 | PASS |
| HSDPA 1900MHz | 9262 | 1852.4 | -19.93 | -13 | PASS |
| | 9538 | 1907.6 | -19.88 | -13 | PASS |
| HSUPA 850MHz | 4132 | 826.4 | -17.54 | -13 | PASS |
| | 4233 | 846.6 | -19.30 | -13 | PASS |
| HSUPA 1900MHz | 9262 | 1852.4 | -17.95 | -13 | PASS |
| | 9538 | 1907.6 | -19.95 | -13 | PASS |

### 3.7 Peak-to-Average Ratio

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

Test Procedures:

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. For GSM/GPRS/EGPRS operating modes:

a. Set the RBW = 1MHz, VBW = 1MHz, Peak detector in spectrum analyzer.
b. Set EUT in maximum power output, and triggered the burst signal.
c. Measured respectively the Peak level and Mean level, and the deviation was recorded as Peak to Average Ratio.

4. For UMTS operating modes:

a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

Test Results:

| Band | ARFCN | Frequency (MHz) | PAR |
|---|---|---|---|
| GSM 1900MHz | 661 | 1880.0 | 0.13 |
| GPRS 1900MHz | 661 | 1880.0 | 0.17 |
| EGPRS 1900MHz | 661 | 1880.0 | 0.21 |
| WCDMA 1900MHz | 9400 | 1880.0 | 3.14 |
| HSDPA 1900MHz | 9400 | 1880.0 | 3.38 |
| HSUPA 1900MHz | 9400 | 1880.0 | 3.73 |

### 3.8 Frequency Stability (FCC Part 2.1055, 22.355, 24.235)

The frequency stability is measured with the temperature variation range of -10˚C to +45˚C and voltage supply variation range of 85% to 115% of nominal AC supply voltage, and/or nominal to battery end points for hand-carried battery-powered supplies.

[ √ ] AC nominal supply voltage: 120VAC
[] Battery nominal voltage: _____VDC; End points: ____VDC

20˚C is taken as temperature in normal condition.

For the 850MHz band, according to 22.355, the stability requirements are: ±1.5ppm for mobile units and ±2.5ppm for portable units.

For the 1900MHz band, according to 24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedures:

1. The EUT was set up in the thermal chamber and connected with the base station.
2. With power OFF, the temperature was decreased to -10 ℃ and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10 ℃ step up to 45 ℃. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

Test results:
GSM 850MHz (AFRCN = 190, Channel frequency = 836.6MHz):

| Input voltage (VDC) | Temperature (˚C) | Frequency deviation (Hz) | Limit (Hz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | -33.80 | ±2091.5 | PASS |
| | 0 | -23.46 | | PASS |
| | +10 | -11.91 | | PASS |
| | +20 | -27.76 | | PASS |
| | +30 | -36.88 | | PASS |
| | +40 | -31.74 | | PASS |
| | +45 | -32.20 | | PASS |
| 102 | +20 | 2.73 | | PASS |
| 138 | +20 | -19.06 | | PASS |

GSM 1900MHz (AFRCN = 512, Channel frequency = 1850.2MHz):

| Input voltage (VDC) | Temperature (˚C) | Measured Frequency (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | 1850.131 | 1850 - 1910 | PASS |
| | 0 | 1850.147 | | PASS |
| | +10 | 1850.133 | | PASS |
| | +20 | 1850.156 | | PASS |
| | +30 | 1850.179 | | PASS |

| | | | | |
|---|---|---|---|---|
| | +40 | 1850.153 | | PASS |
| | +45 | 1850.128 | | PASS |
| 102 | +20 | 1850.166 | | PASS |
| 138 | +20 | 1850.149 | | PASS |

GSM 1900MHz (AFRCN = 810, Channel frequency = 1909.8MHz):

| Input voltage (VDC) | Temperature (˚C) | Measured Frequency (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | 1909.727 | 1850 - 1910 | PASS |
| | 0 | 1909.749 | | PASS |
| | +10 | 1909.747 | | PASS |
| | +20 | 1909.745 | | PASS |
| | +30 | 1909.737 | | PASS |
| | +40 | 1909.758 | | PASS |
| | +45 | 1909.729 | | PASS |
| 102 | +20 | 1909.746 | | PASS |
| 138 | +20 | 1909.780 | | PASS |

GPRS 850MHz (AFRCN = 190, Channel frequency = 836.6MHz):

| Input voltage (VDC) | Temperature (˚C) | Frequency deviation (Hz) | Limit (Hz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | 7.6 | ±2091.5 | PASS |
| | 0 | -37.9 | | PASS |
| | +10 | -34.4 | | PASS |
| | +20 | -47.7 | | PASS |
| | +30 | -60.0 | | PASS |
| | +40 | -17.1 | | PASS |
| | +45 | -41.0 | | PASS |
| 102 | +20 | -36.5 | | PASS |
| 138 | +20 | -59.5 | | PASS |

GPRS 1900MHz (AFRCN = 512, Channel frequency = 1850.2MHz):

| Input voltage (VDC) | Temperature (˚C) | Measured Frequency (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | 1850.169 | 1850 - 1910 | PASS |
| | 0 | 1850.189 | | PASS |
| | +10 | 1850.149 | | PASS |
| | +20 | 1850.144 | | PASS |
| | +30 | 1850.148 | | PASS |
| | +40 | 1850.181 | | PASS |
| | +45 | 1850.170 | | PASS |
| 102 | +20 | 1850.136 | | PASS |
| 138 | +20 | 1850.166 | | PASS |

GPRS 1900MHz (AFRCN = 810, Channel frequency = 1909.8MHz):

| Input voltage (VDC) | Temperature (˚C) | Measured Frequency (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | 1909.771 | 1850 - 1910 | PASS |
| | 0 | 1909.786 | | PASS |
| | +10 | 1909.765 | | PASS |
| | +20 | 1909.748 | | PASS |
| | +30 | 1909.735 | | PASS |
| | +40 | 1909.780 | | PASS |
| | +45 | 1909.729 | | PASS |
| 102 | +20 | 1909.743 | | PASS |
| 138 | +20 | 1909.778 | | PASS |

EGPRS 850MHz (AFRCN = 190, Channel frequency = 836.6MHz):

| Input voltage (VDC) | Temperature (˚C) | Frequency deviation (Hz) | Limit (Hz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | -19.71 | ±2091.5 | PASS |
| | 0 | -18.15 | | PASS |
| | +10 | -24.12 | | PASS |
| | +20 | -25.11 | | PASS |
| | +30 | -35.73 | | PASS |
| | +40 | -38.89 | | PASS |
| | +45 | -26.22 | | PASS |
| 102 | +20 | -34.79 | | PASS |
| 138 | +20 | -21.15 | | PASS |

EGPRS 1900MHz (AFRCN = 512, Channel frequency = 1850.2MHz):

| Input voltage (VDC) | Temperature (˚C) | Measured Frequency (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | 1850.182 | 1850 - 1910 | PASS |
| | 0 | 1850.187 | | PASS |
| | +10 | 1850.189 | | PASS |
| | +20 | 1850.187 | | PASS |
| | +30 | 1850.191 | | PASS |
| | +40 | 1850.163 | | PASS |
| | +45 | 1850.155 | | PASS |
| 102 | +20 | 1850.177 | | PASS |
| 138 | +20 | 1850.141 | | PASS |

EGPRS 1900MHz (AFRCN = 810, Channel frequency = 1909.8MHz):

| Input voltage (VDC) | Temperature (˚C) | Measured Frequency (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | 1909.782 | 1850 - 1910 | PASS |
| | 0 | 1909.787 | | PASS |
| | +10 | 1909.789 | | PASS |
| | +20 | 1909.787 | | PASS |
| | +30 | 1909.791 | | PASS |
| | +40 | 1909.763 | | PASS |
| | +45 | 1909.755 | | PASS |
| 102 | +20 | 1909.777 | | PASS |
| 138 | +20 | 1909.741 | | PASS |

WCDMA 850MHz (AFRCN = 4183, Channel frequency = 836.6MHz):

| Input voltage (VDC) | Temperature (˚C) | Frequency deviation (Hz) | Limit (Hz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | 2.8 | ±2091.5 | PASS |
| | 0 | -6.8 | | PASS |
| | +10 | -5.3 | | PASS |
| | +20 | -6.4 | | PASS |
| | +30 | -5.5 | | PASS |
| | +40 | 2.7 | | PASS |
| | +45 | 8.1 | | PASS |
| 102 | +20 | -7.3 | | PASS |
| 138 | +20 | -4.8 | | PASS |

WCDMA 1900MHz (AFRCN = 9262, Channel frequency = 1852.4MHz):

| Input voltage (VDC) | Temperature (˚C) | Measured Frequency (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | 1852.406 | 1850 - 1910 | PASS |
| | 0 | 1852.408 | | PASS |
| | +10 | 1852.407 | | PASS |
| | +20 | 1852.393 | | PASS |
| | +30 | 1852.398 | | PASS |
| | +40 | 1852.396 | | PASS |
| | +45 | 1852.395 | | PASS |
| 102 | +20 | 1852.386 | | PASS |
| 138 | +20 | 1852.407 | | PASS |

WCDMA 1900MHz (AFRCN = 9538, Channel frequency = 1907.6MHz):

| Input voltage (VDC) | Temperature (˚C) | Measured Frequency (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | 1907.607 | 1850 - 1910 | PASS |
| | 0 | 1907.606 | | PASS |
| | +10 | 1907.608 | | PASS |
| | +20 | 1907.609 | | PASS |
| | +30 | 1907.608 | | PASS |
| | +40 | 1907.605 | | PASS |
| | +45 | 1907.602 | | PASS |
| 102 | +20 | 1907.584 | | PASS |
| 138 | +20 | 1907.592 | | PASS |

HSDPA 850MHz (AFRCN = 4183, Channel frequency = 836.6MHz):

| Input voltage (VDC) | Temperature (˚C) | Frequency deviation (Hz) | Limit (Hz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | -4.1 | ±2091.5 | PASS |
| | 0 | -1.2 | | PASS |
| | +10 | -2.7 | | PASS |
| | +20 | -4.7 | | PASS |
| | +30 | 2.9 | | PASS |
| | +40 | -2.5 | | PASS |
| | +45 | 0.6 | | PASS |
| 102 | +20 | -5.9 | | PASS |
| 138 | +20 | -2.8 | | PASS |

HSDPA 1900MHz (AFRCN = 9262, Channel frequency = 1852.4MHz):

| Input voltage (VDC) | Temperature (˚C) | Measured Frequency (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | 1852.393 | 1850 - 1910 | PASS |
| | 0 | 1852.403 | | PASS |
| | +10 | 1852.394 | | PASS |
| | +20 | 1852.393 | | PASS |
| | +30 | 1852.398 | | PASS |
| | +40 | 1852.391 | | PASS |
| | +45 | 1852.391 | | PASS |
| 102 | +20 | 1852.386 | | PASS |
| 138 | +20 | 1852.393 | | PASS |

HSDPA 1900MHz (AFRCN = 9538, Channel frequency = 1907.6MHz):

| Input voltage (VDC) | Temperature (˚C) | Measured Frequency (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | 1907.609 | 1850 - 1910 | PASS |
| | 0 | 1907.607 | | PASS |
| | +10 | 1907.604 | | PASS |
| | +20 | 1907.586 | | PASS |
| | +30 | 1907.593 | | PASS |
| | +40 | 1907.600 | | PASS |
| | +45 | 1907.595 | | PASS |
| 102 | +20 | 1907.613 | | PASS |
| 138 | +20 | 1907.586 | | PASS |

HSUPA 850MHz (AFRCN = 4183, Channel frequency = 836.6MHz):

| Input voltage (VDC) | Temperature (˚C) | Frequency deviation (Hz) | Limit (Hz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | -2.9 | ±2091.5 | PASS |
| | 0 | 1.5 | | PASS |
| | +10 | 6.3 | | PASS |
| | +20 | 7.4 | | PASS |
| | +30 | 0.4 | | PASS |
| | +40 | -1.4 | | PASS |
| | +45 | 3.3 | | PASS |
| 102 | +20 | -10.8 | | PASS |
| 138 | +20 | -4.8 | | PASS |

HSUPA 1900MHz (AFRCN = 9262, Channel frequency = 1852.4MHz):

| Input voltage (VDC) | Temperature (˚C) | Measured Frequency (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | 1852.404 | 1850 - 1910 | PASS |
| | 0 | 1852.402 | | PASS |
| | +10 | 1852.406 | | PASS |
| | +20 | 1852.393 | | PASS |
| | +30 | 1852.387 | | PASS |
| | +40 | 1852.365 | | PASS |
| | +45 | 1852.393 | | PASS |
| 102 | +20 | 1852.384 | | PASS |
| 138 | +20 | 1852.411 | | PASS |

HSUPA 1900MHz (AFRCN = 9538, Channel frequency = 1907.6MHz):

| Input voltage (VDC) | Temperature (˚C) | Measured Frequency (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|
| 120 | -10 | 1907.605 | 1850 - 1910 | PASS |
| | 0 | 1907.602 | | PASS |
| | +10 | 1907.606 | | PASS |
| | +20 | 1907.592 | | PASS |
| | +30 | 1907.600 | | PASS |
| | +40 | 1907.608 | | PASS |
| | +45 | 1907.599 | | PASS |
| 102 | +20 | 1907.585 | | PASS |
| 138 | +20 | 1907.588 | | PASS |

### 3.9 Radio Frequency Exposure Compliance

EUT is subject to the radio frequency exposure requirements specified in FCC Rule §§ 1.1307(b), 2.1093. It shall be considered to operate in a "general population / uncontrolled" environment.

[ ] Portable unit: EUT was evaluated for Specific Absorption Rate (SAR) evaluation compliance according to OET Bulletin 65, Supplement C (Edition 01-01). It is in compliance with the SAR evaluation requirements. The caution statement is saved as filename: RF exposure info.pdf. A SAR test report was submitted at same time and saved as SAR Report.pdf.

[ × ] Mobile unit: EUT was evaluated for Maximum Permissible Exposure (MPE) evaluation compliance according to OET Bulletin 65(Edition 97-01). The evaluation calculation results are saved as filename: RF exposure info.pdf.

**END OF TEST REPORT**