# EMC TEST REPORT

| | | | |
|---|---|---|---|
| **Project No.** | LBE20121899 | **Issue No.** | 1 |
| **Applicant** | **Name of organization** | Samsung Electronics Co., Ltd. | |
| | **Address** | 416, Maetan 3-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-742, Republic of Korea | |
| | **Date of application** | March 20, 2012 | |
| **EUT** | **Type of device** | Class B personal computers and peripherals | |
| | **Equipment authorization** | ☐ Declaration of Conformity ☒ Certification ☐ Verification | |
| | **FCC ID** | A3LGTC3313T | |
| | **Kind of product** | Mobile Phone | |
| | **Model No.** | GT-C3313T | |
| | **Variant Model No.** | Refer to clause 3.5 | |
| | **Manufacturer** | SAMSUNG ELECTRONICS<br>13097-105 Rua Thomas Nilsen Junior,<br>150 Parte B - Parque Imp Campinas Sao Paulo, Brazil | |
| **Applied Standards** | | FCC Part 15, Subpart B, Class B / ANSI C63.4-2003 | |
| **Test Period** | | March 20, 2012 ~ March 22, 2012 | |
| **Issue date** | | March 26, 2012 | |

**Test result** : **Complied**

The equipment under test has found to be compliant with the applied standards.
(Refer to the attached test result for more detail.)

| | |
|---|---|
| **Tested by** : Ho-Jin Choi | **Reviewed by** : Tae-Young Jang |



SAMSUNG

416, Maetan 3-dong, Yeongtong-gu, Suwon-si, Gyeonggi-so, 443-742, Republic of Korea
Tel: 82 31 279 1750, Fax: 82 31 279 1745

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# 1. Summary of test results

## 1.1 Emission

The EUT has been tested according to the following specifications:

| Applied | Test type | Applied standard | Result | Remarks |
|---|---|---|---|---|
| ☒ | Conducted Disturbance (Mains port) | FCC Part 15 Subpart B / ANSI C63.4-2003 | Complied | Meets Class B Limit |
| ☒ | Radiated Disturbance | | Complied | Meets Class B Limit |

# 2. General Information

## 2.1 Test facility

The CS & Environment center is located on Samsung Electronics Co., Ltd. at 416, Maetan 3-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Republic of Korea.
All testing are performed in Semi-anechoic chambers conforming to the site attenuation Characteristics defined by ANSI C63.4, CISPR 22, 16-1 and 16-2. and Shielded rooms.

The CS & Environment center is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:2005.

# 3. Test Setup configuration

## 3.1 Test Peripherals

The cables used for these peripherals are either permanently attached by the peripheral manufacturer or coupled with an assigned cable as defined below.
The following is a listing of the EUT and peripherals utilized during the performance of EMC test:

| Description | Model No. | Serial No. | Manufacturer/ Trademark | FCC ID / DoC |
|---|---|---|---|---|
| Mobile Phone | GT-C3313T | - | SAMSUNG | A3LGTC3313T |
| Battery | AB463651BU | TH1B518FS/4-B | SAMSUNG | - |
| Headset | EHS61ASFWE | - | SAMSUNG | - |
| Data Cable | ECC1DU0BBK | KD1B930TS E | SAMSUNG | - |
| microSD Card | 2GB | - | SANDISK | - |
| Desk-Top Computer | DCME | 8JBVSBX | DELL | DoC |
| LCD Monitor | GH15LS | N719HVELA11890L | SAMSUNG | DoC |
| Mouse | MOARUO | MS-S5-AR03-01 | SAMSUNG | DoC |
| Keyboard | GP-K5000U | 15000099 | SAMSUNG | DoC |

## 3.2 EUT operating mode

To achieve compliance applied standard specification, the following mode(s) were made during compliance testing:

| | |
|---|---|
| **Operating Mode 1** | PC USB Charge Mode |

## 3.3 Details of Sampling

Customer selected, single unit.

## 3.4 Used cable description

The EUT is configured, installed, arranged and operated in a manner consistent with typical applications. Interface cables/loads/devices are connected to at least one of each type of interface port of the EUT, and where practical, each cable shall be terminated in a device typical of actual usage. The type(s) of interconnecting cables to be used and the interface port (of the EUT) to which these were connected;

| Connected cable | Length [m] | Shielded [Y/N] | Note |
|---|---|---|---|
| Data Cable | 1.5 | Yes | From EUT to Desk-Top Computer |
| Headset | 1.6 | No | - |
| Power | 1.8 | No | For Desk-Top Computer |
| Power | 1.8 | No | For LCD Monitor |
| LAN | 3.0 | No | From Desk-Top Computer to Local Area Network |
| RGB | 1.8 | Yes | From Desk-Top Computer to LCD Monitor |
| USB | 1.8 | Yes | From Desk-Top Computer to Mouse |
| USB | 1.5 | Yes | From Desk-Top Computer to Keyboard |

## 3.5 EUT Description

1. The following features describe EUT represented by this report:

| Item | Specification | |
|---|---|---|
| Frequency Range | GSM850 | TX : 824.2 ~ 848.8 MHz<br>RX : 869.2 ~ 893.8 MHz |
| | PCS1900 | TX : 1 850.2 ~ 1 909.8 MHz<br>RX : 1 930.2 ~ 1 989.8 MHz |
| Operating Temperature (℃) | -20 ~ +50 | |
| Operating Humidity (%) | 0 ~ 95 | |

2. The variant models

- None

## 3.6 Clock Frequencies

| Kind of Clocks | Frequency [ MHz ] |
|---|---|
| **CPU** | **500** |
| **USB 2.0** | **12** |

## 3.7 Test configuration and condition

The system was configured for testing in a typical fashion that a customer would normally use, and was tested while in an automated non-attendant mode.

Power source for the EUT operating was supplied by CVCF made by the Pacific Power Source Corp.

**- Test Voltage : AC 120 V, 60 Hz**

## 3.8 Measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus: (According to CISPR 16-4 and UKAS Lab 34.)

### 3.8.1 Emission

| Test type | | Measurement uncertainty (C.L. 95 %, k = 2) |
|---|---|---|
| Conducted disturbance | AC Mains | ±3.03 dB |
| Radiated Disturbance (30 MHz ~ 1 GHz) | Horizontal | ±4.61 dB |
| | Vertical | ±4.60 dB |
| Radiated Disturbance (1 GHz ~ 6 GHz) | | ±4.09 dB |

# 4. Results of individual test

## 4.1 Conducted disturbance

Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration. The EUT measured in accordance with the methods described in standards.

**Limits for conducted disturbance at the mains ports**

| Frequency range Limits MHz | Resolution Bandwidth | Limits dB(μV) | |
|---|---|---|---|
| | | Quasi-peak | Average |
| 0,15 to 0,50 | 9 kHz | 66 to 56 | 56 to 46 |
| 0,50 to 5 | 9 kHz | 56 | 46 |
| 5 to 30 | 9 kHz | 60 | 50 |

### 4.1.1 Test instrumentation

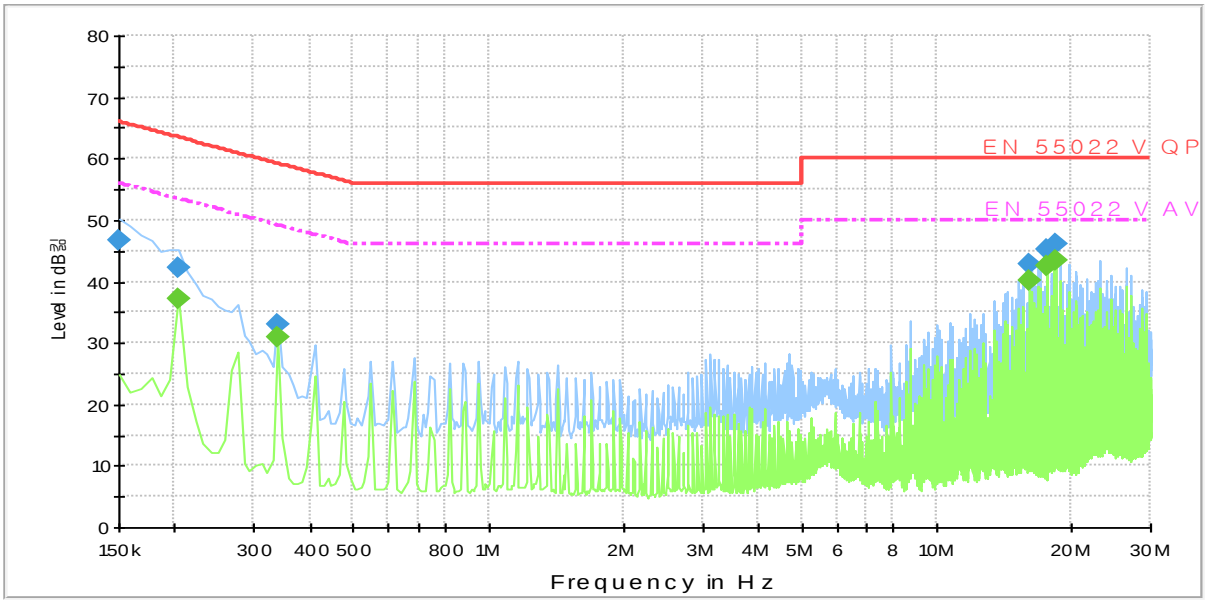
| EMC No. | Test Instrument | Model name | Manufacturer | Serial No. | Calibration | |
|---|---|---|---|---|---|---|
| | | | | | Date | Interval (Month) |
| E4I-093 | Test Receiver | ESCI | R&S | 100086 | 2011-11-11 | 12 |
| E3I-050 | LISN | ESH3-Z5 | R&S | 100263 | 2011-10-12 | 12 |
| E3I-259 | LISN | ENV216 | R&S | 101369 | 2011-10-11 | 12 |

### 4.1.2 Temperature and humidity condition

| | | | |
|---|---|---|---|
| **Test date** | 2012-03-22 | **Test engineer** | Ho-Jin Choi |
| **Climate condition** | Ambient temperature | 20.8 ℃ | Limit (15.0 to 35.0) ℃ |
| | Relative humidity | 61.3 % R.H. | Limit (25.0 to 75.0) % R.H. |
| | Atmospheric pressure | 101.6 kPa | Limit (86.0 to 106.0) kPa |
| **Test place** | Shield Room (SR8) | | |

## 4.1.3 Test results

### - Operating Mode 1: AC Mains




Note 1) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

Quasi-peak final measurement results table:

| Frequency (MHz) | Level (dBµV) | Corr. (dB) | Limit (dBµV) | Margin (dB) | Line |
|---|---|---|---|---|---|
| 0.150 | 46.6 | 9.9 | 66.00 | 19.40 | N |
| 0.204 | 42.1 | 10.0 | 63.40 | 21.40 | L1 |
| 0.339 | 33.0 | 10.0 | 59.20 | 26.20 | N |
| 16.170 | 42.8 | 9.9 | 60.00 | 17.20 | N |
| 17.691 | 45.2 | 10.0 | 60.00 | 14.80 | N |
| 18.366 | 46.0 | 10.0 | 60.00 | 14.00 | N |

Average final measurement results table:

| Frequency (MHz) | Level (dBµV) | Corr. (dB) | Limit (dBµV) | Margin (dB) | Line |
|---|---|---|---|---|---|
| 0.204 | 37.3 | 10.0 | 53.40 | 16.20 | L1 |
| 0.339 | 30.9 | 10.0 | 49.20 | 18.30 | N |
| 16.170 | 40.3 | 9.9 | 50.00 | 9.80 | N |
| 17.691 | 42.6 | 10.0 | 50.00 | 7.40 | N |
| 18.366 | 43.4 | 10.0 | 50.00 | 6.60 | N |

Note 2) Level (QP and/or AV) = Meter Reading (QP and/or AV) + Corr. (LISN Insertion Loss + Cable Loss)
Margin (QP and/or AV) = Limit – Level (QP and/or AV)
QP = Quasi-Peak, AV = Average

## 4.2 Radiated disturbance

Of those disturbances above (*L* - 20dB), where *L* is the limit level in logarithmic units, record at least the disturbance levels and the frequencies of the six highest disturbances.
The following data lists the significant emission frequencies, measured levels, correction factors (for antenna and cables), orientation of table, polarization and height of antenna, the corrected reading, the limit, and the amount of margin.

Peak measurements were made over the changeable frequency range 30 MHz to 1 GHz at a measurement distance of 3 m for the following antenna and turntable arrangements:

| Antenna Height [ cm ] | Antenna Polarisation | RBW | VBW | Turntable position [ degrees ] |
|---|---|---|---|---|
| 100 ~ 400 | Horizontal, Vertical | 120 kHz | 300 kHz | Continuous |

Measurements within 20 dB of the limit were then maximized by adjusting turntable position.
Final measurements were made using quasi-peak detectors.

Peak/Average measurements were made over the changeable frequency range 1 GHz to 40 GHz or 5$^{th}$ harmonics of the highest frequency in accordance with internal maximum operating frequency at a measurement distance of 3 m for the following antenna and turntable arrangements:

| Antenna Height [ cm ] | Antenna Polarisation | RBW | VBW | Turntable position [ degrees ] |
|---|---|---|---|---|
| 100 ~ 400 | Horizontal, Vertical | 1 MHz (PK / AV) | 3 MHz (PK) 10 Hz (AV) | Continuous |

Measurements within 20 dB of the limit were then maximized by adjusting turntable position.
Final measurements were made using peak and average detectors.

**Limits for radiated disturbance of ITE at a measuring distance of 3 m**

| Frequency range Limits [ MHz ] | Field Strength | |
|---|---|---|
| | µV/m | dB(µV/m) |
| 30 to 88 | 100 | 40.0 |
| 88 to 216 | 150 | 43.5 |
| 216 to 960 | 200 | 46.0 |
| Above 960 | 500 | 54.0 |

Results checked manually; and points close to the limit line were re-measured.

## 4.2.1 Test instrumentation

| EMC No. | Test Instrument | Model name | Manufacturer | Serial No. | Calibration | |
|---|---|---|---|---|---|---|
| | | | | | Date | Interval (Month) |
| E3I-130 | BILOG Antenna | CBL6112D | TESEQ | 25513 | 2010-11-12 | 24 |
| E3I-231 | Horn Antenna | 3115 | ETS Lindgren | 00101620 | 2012-01-12 | 24 |
| E3I-175 | Preamplifier | 310N | Sonoma | 273121 | 2011-12-06 | 12 |
| E3I-257 | EMI Test Receiver | ESU26 | R&S | 100364 | 2011-10-24 | 12 |

## 4.2.2 Temperature and humidity condition

| **Test date** | 2012-03-20 | **Test engineer** | Ho-Jin Choi |
|---|---|---|---|
| **Climate condition** | Ambient temperature | 21.5 ℃ | Limit (15.0 to 35.0) ℃ |
| | Relative humidity | 29.0 % R.H. | Limit (25.0 to 75.0) % R.H. |
| | Atmospheric pressure | 102.0 kPa | Limit (86.0 to 106.0) kPa |
| **Test place** | Semi-Anechoic Chamber (SAC4) | | |

## 4.2.3 Test results

### ☐ Operating Mode 1

### - Frequency range: 30 ~ 1 000 MHz

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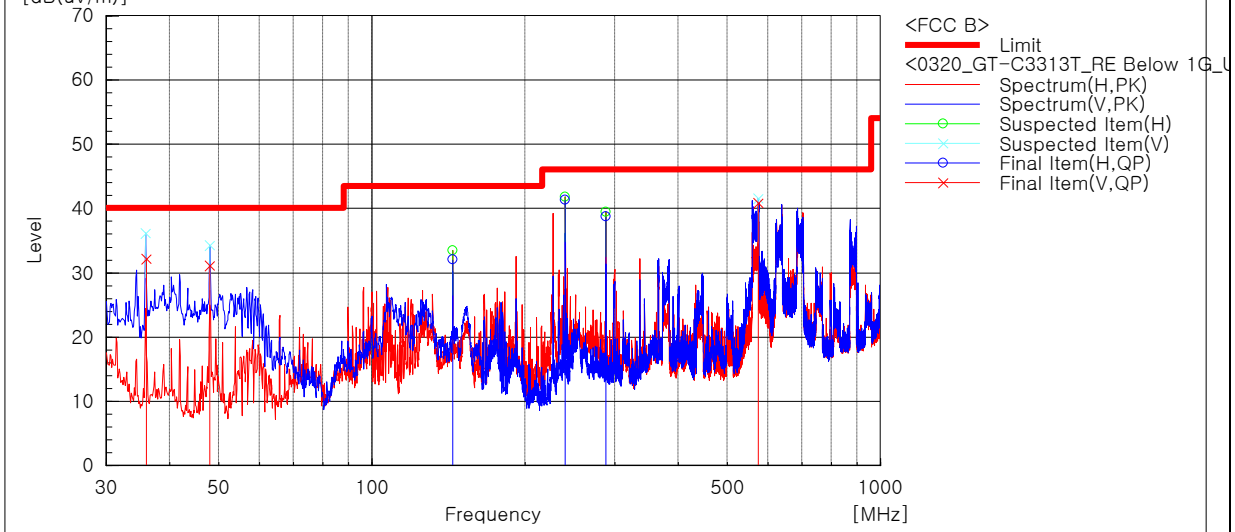
<<RADIATED EMISSION>>

0320_GT-C3313T_RE Below 1G_USB DATA.dat

Model :
Serial :
Operator :
AC Power :
Temp,Humidity :

Standard : FCC Part.15 Class B 3m
Remark1 :
Remark2 :
Remark3 :
Remark4 :




Final Result

| No. | Frequency [MHz] | (P) | Reading QP [dB(uV)] | c.f QP [dB(1/m)] | Result QP [dB(uV/m)] | Limit QP [dB(uV/m)] | Margin QP [dB] | Height [cm] | Angle [deg] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 35.899 | V | 47.7 | -15.5 | 32.2 | 40.0 | 7.8 | 100.0 | 7.0 |
| 2 | 47.984 | V | 52.7 | -21.5 | 31.2 | 40.0 | 8.8 | 100.0 | 344.0 |
| 3 | 143.996 | H | 50.3 | -18.2 | 32.1 | 43.5 | 11.4 | 202.0 | 299.0 |
| 4 | 239.999 | H | 59.5 | -18.2 | 41.3 | 46.0 | 4.7 | 100.0 | 17.0 |
| 5 | 288.092 | H | 54.2 | -15.4 | 38.8 | 46.0 | 7.2 | 113.0 | 358.0 |
| 6 | 575.673 | V | 50.0 | -9.1 | 40.9 | 46.0 | 5.1 | 100.0 | 213.0 |

Note) Receiving antenna polarization : Horizontal, Vertical

Test Distance : 3 m, Antenna Height : 1 to 4 meters

Level (QP) = Reading (QP) + c.f (Antenna Factor + Cable Loss - Amp. Gain)

Margin (QP) = Limit – Level (QP)

QP = Quasi-Peak

## ☐ Operating Mode 1

### - Frequency range: 1 000 ~ 6 000 MHz

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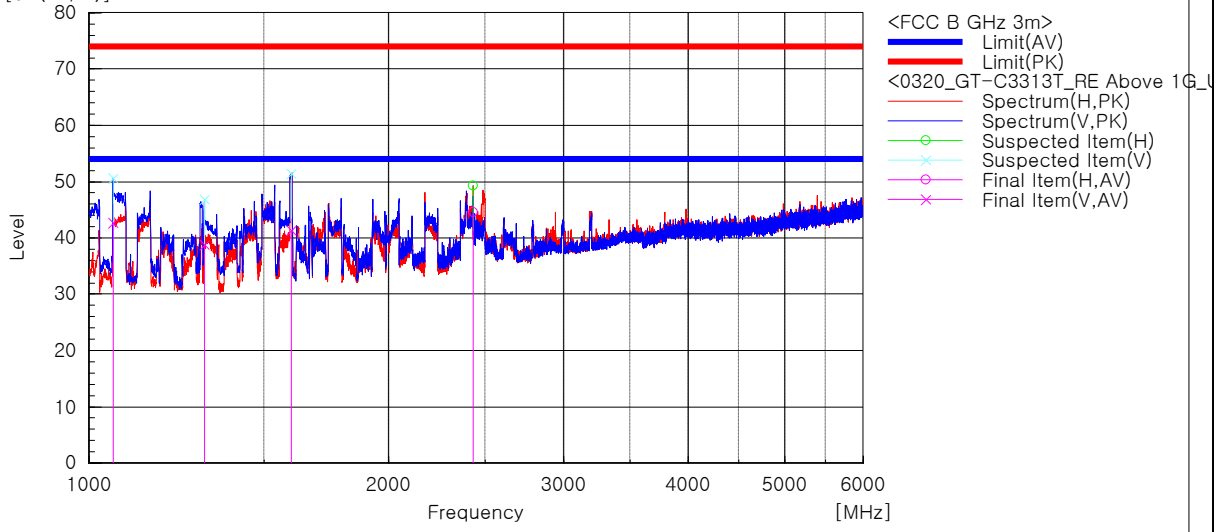
IT Center

<<RADIATED EMISSION>>

0320_GT-C3313T_RE Above 1G_USB DATA.dat

Model :
Serial :
Operator :
AC Power :
Temp,Humidity :

Standard : FCC Class B GHz 3m
Remark1 :
Remark2 :
Remark3 :
Remark4 :




Final Result

| No. | Frequency [MHz] | (P) | Reading AV [dB(uV)] | c.f [dB(1/m)] | Result AV [dB(uV/m)] | Limit AV [dB(uV/m)] | Margin AV [dB] | Height [cm] | Angle [deg] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1056.895 | V | 54.9 | -12.2 | 42.7 | 54.0 | 11.3 | 100.0 | 193.0 |
| 2 | 1305.686 | V | 50.1 | -11.3 | 38.8 | 54.0 | 15.2 | 100.0 | 200.0 |
| 3 | 1597.586 | V | 51.1 | -9.7 | 41.4 | 54.0 | 12.6 | 100.0 | 88.0 |
| 4 | 2431.926 | H | 49.4 | -4.9 | 44.5 | 54.0 | 9.5 | 100.0 | 345.0 |

Note 1) Representative operating modes were selected by customer and any emissions that do NOT exceed Average limit were not tested with peak detector mode.

Note 2) Receiving antenna polarization : Horizontal, Vertical

Test Distance : 3 m, Antenna Height : 1 to 4 meters

Level (PK and/or AV) = Reading (PK and/or AV) + c.f (Antenna Factor + Cable Loss - Amp. Gain)

Margin (PK and/or AV) = Limit – Level (PK and/or AV)

PK = Peak, AV = Average