# EMI TEST REPORT

**Test report No.** : **EMC- FCC- 0244**

**Type of equipment** : **Digital Video Camcorder**

**Model No.** : **SC-D6550**

**FCC ID.** : **A3L05GAMMA3**

**Applicant** : **SAMSUNG ELECTRONICS CO., LTD.**

**Test standards** : **FCC part 15 subpart B, Class B**

**Test Procedure and Items :**

- AC Power Line Conducted Emissions Measurement: ANSI C63.4-1992
- Radiated Emissions Measurement : ANSI C63.4-1992

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

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC Rules and Regulations.
The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Date of test: 2005. 03. 24 Issued date: 2005 .03. 25

Tested by : YOO, SANG HUN

Approved by: Chung, Min-Seok

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# 1. Client information

| | |
|---|---|
| Applicant: | SAMSUNG ELECTRONICS CO., LTD. |
| Address: | 416, Maetan-3Dong, Yeongtong-Gu, Suwon City, Kyungki-Do, Korea |
| Telephone number: | 82-31-200-5922 |
| Facsimile number: | 82-31-200-5938 |

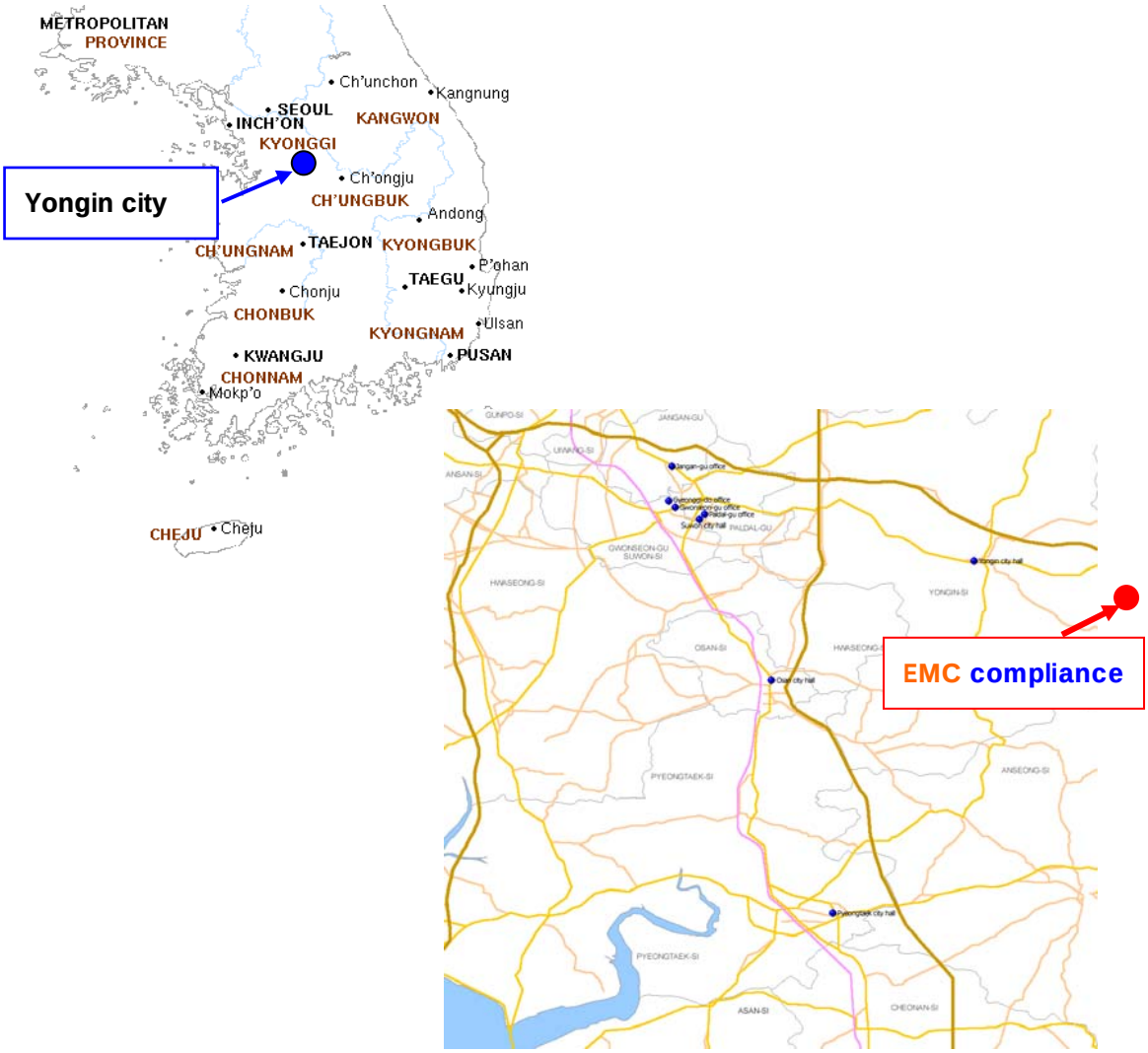
| | |
|---|---|
| Manufacture: | SAMSUNG ELECTRONICS CO., LTD. |
| Address: | 416, Maetan-3Dong, Yeongtong-Gu, Suwon City, Kyungki-Do, Korea |
| Telephone number: | 82-31-200-5922 |
| Facsimile number: | 82-31-200-5938 |

# 2. Laboratory information

**Address**

**EMC compliance Ltd.**
82-1, JEIL-RI, YANGJI-MYUN, YOUNGIN-CITY, KYUNGGI-DO, KOREA
Telephone Number : 82 31 336 9919
Facsimile Number : 82 31 336 4767

FCC Filing No. : 793334
VCCI Registration No. : C-1713, R-1606
KOLAS NO.: 231
SITE MAP



# 3. Test system configuration

## 3.1 Operation Environment

| | | Temperature | Humidity | Pressure |
|---|---|---|---|---|
| OATS | : | 4 °C | 38 % | 1010 hPa |
| Shielded room | : | 25 °C | 36 % | 1010 hPa |

**Test site**

These testing were performed following locations;

Shielded room: Conducted emission
OATS (10m) : Radiated emission

## 3.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMI. The factors contributing to uncertainties are test receiver, Cable Loss, antenna factor calibration, Antenna directivity, antenna factor Variation with height, antenna phase center variation, antenna Frequency interpolation, measurement distance variation, Site imperfection, mismatching, and system repeatability.

Based on NIS 80, 81, the measurement uncertainty level with a 95% confidence level was applied.

## 3.3 Sample calculation

Conducted emission

The field strength is calculated by adding the LISN factor, cable loss tr the measured reading.
The sample calculation is as follows :

FS = MR + LF + CL
MR = Meter Reading
LF = LISN Factor
CL = Cable Loss
If MR is 30dB, LISN Factor 1dB, CL 1dB
The result (MR) is
30 + 1 + 1 = 32dBuV

Radiated emission

The field strength is calculated adding the antenna Factor, cable loss and, Antenna pad adding, subtracting the amplifier gain from the measured reading.
The sample calculation is as follows :

FS = MR + AF + CL + AT –AG
MR = Meter Reading
AF = Antenna Factor
CL = Cable Loss
AP = Antenna Pad
AG=Amplifier Gain

If MR is 30dB, AF 12dB, CL 5dB, AP 10dB, AG 35dB
The result (MR) is
30 + 12 + 5 + 10 –35 = 22dBuV/m

# 4. Description of EUT

## 4.1 Product Description

| | |
|---|---|
| **Manufactured by:** | **SAMSUNG ELECTRONICS CO., LTD.** |
| **Address:** | 416, Maetan-3Dong, Yeontong-Gu, Suwon City, Kyungki-Do, Korea |
| **Type of equipment:** | Digital Video Camcorder |
| **Model:** | SC-D6550 |
| **Serial number:** | None |
| **Power supply:** | DC 7.4V, Lithium Ion Battery pack<br>(Power Supply(100V-240V) or Lithium Ion battery pack) |

## 4.2 Peripherals

| Description | Model / Part # | Serial Number | Manufacture |
|---|---|---|---|
| PC | Presario S6500KR | KRJ41103C7 | COMPAQ |
| LCD MONITOR | cx714MP | N495H4KXB00713H | SAMSUNG |
| PRINTER | EPSON STYLUS C60 | DR5K015097 | EPSON |
| KEYBOARD | SEM-DT35 | 95047334 | SAMSUNG |
| SERIAL MOUSE | OK-720 | N/A | A4Tech |
| PS/2 MOUSE | M-S34 | F13490N5BI66KMD | COMPAQ |
| MIC | N/A | N/A | N/A |
| HEADSET | C-322 | N/A | LABTEC |

## 4.3 Used cables

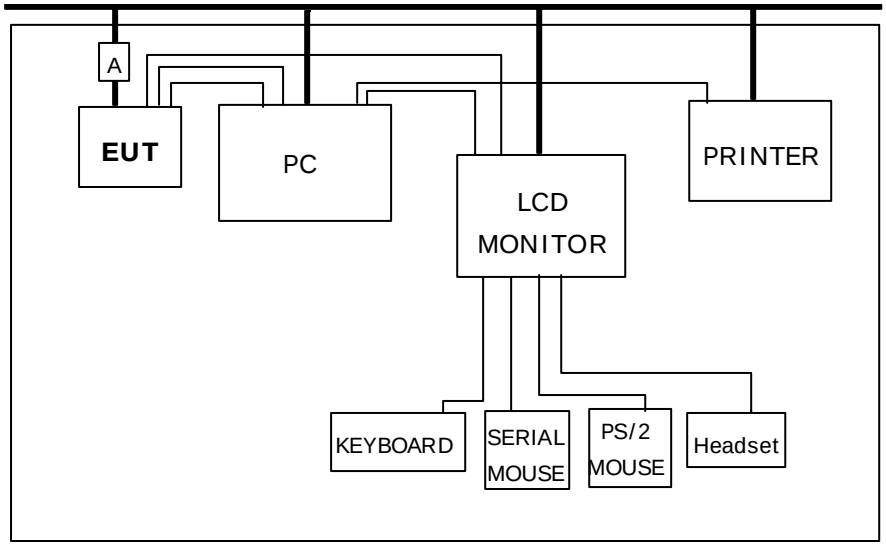
| EUT Port | Type | Shield (Y/N) | Length (m) | Connection point 1 | Connection point 2 |
|---|---|---|---|---|---|
| USB | USB | Y | 1.0 | EUT | PC |
| IEEE1394 | 1394 | Y | 1.8 | | PC |
| S-Video | DIN | Y | 1.2 | | LCD MONITOR |
| Audio | Audio | Y | 1.2 | | LCD MONITOR |
| Video | Video | Y | 1.2 | | LCD MONITOR |

## 4.4 Operating conditions

Operating :

- USD, 1394, RECORDING mode.

### 4.5 EUT test configuration




# 5. Summary of test results

### 5.1 Modification to the E.U.T.

None

### 5.2 Standards & results

FCC Part 15 Subpart B (Class B)
ANSI C63.4 – 1992

| Test items | Test methods | Result |
|---|---|---|
| Conducted emission | ANSI C63.4-1992 | Pass |
| Radiated emission | ANSI C63.4-1992 | Pass |

# 6. Test results

## 6.1 Conducted emission

### 6.1.1 Measurement procedure

**Mains**

The measurements were performed in a shielded room.
EUT was placed on a non-metallic table height of 0.8m above the reference ground plane.
The rear of tabletop was located 0.4m to the vertical conducted plane.
All other surfaces of tabletop were at least 0.8m away from any other grounded conducting surface.
They were folded back and forth forming a bundle 0.3m to 0.4m long and were hanged at a 0.4m height to the ground plane.
Each EUT power lead, except ground (safety) lead, was individually connected through a LISN to input power source.
Both lines of power cord, hot and neutral were measured.

### 6.1.2 Used equipments

| Equipment | Model | Serial no. | Makers | Next Cal. date | Used |
|---|---|---|---|---|---|
| Test receiver | ESHS10 | 843276/003 | R&S | 04.05.13 | ☒ |
| L.I.S.N. | ESH3-Z5 | 100267 | R&S | 04.06.17 | ☒ |
| | L3-32A | 0120J20305 | PMM | 05.04.03 | ☒ |
| Test site | Shield room | - | - | - | ☒ |

### 6.1.3 Measurement uncertainty

Conducted emission measurement : ± 2.4 (K=2, 95%)

### 6.1.4 Test data

| Frequency | Correction Factor | | Line | Quasi-peak | | | Average | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Limit | Reading | Result | Limit | Reading | Result |
| [MHz] | LISN | Cable | | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] |
| 0.195 | 0.03 | 0.2 | H | 63.82 | 55.24 | 55.47 | 53.82 | 42.73 | 42.96 |
| 0.258 | 0.03 | 0.2 | H | 61.50 | 46.85 | 47.08 | 51.50 | 31.19 | 31.42 |
| 0.324 | 0.08 | 0.2 | H | 59.60 | 39.20 | 39.48 | 49.60 | 25.96 | 26.24 |
| 0.393 | 0.10 | 0.2 | H | 58.00 | 33.75 | 34.05 | 48.00 | 22.51 | 22.81 |
| 0.447 | 0.10 | 0.2 | H | 56.93 | 33.03 | 33.33 | 46.93 | 16.13 | 16.43 |
| 0.537 | 0.10 | 0.3 | N | 56.00 | 33.68 | 34.08 | 46.00 | 21.07 | 21.47 |
| 4.420 | 0.15 | 0.5 | N | 56.00 | 37.34 | 37.99 | 46.00 | 24.64 | 25.29 |
| 5.010 | 0.18 | 0.4 | H | 60.00 | 37.28 | 37.86 | 50.00 | 25.75 | 26.33 |

- Note. QP = Quasi-Peak, AV= Average
- Loss = LISN Loss + Cable Loss
- Measurement time : 1 s

### 6.1.5. Result

Complied

## 6.2 Radiated emission

### 6.2.1 Measurement procedure

A pretest was performed at 3m distance in a semi-anechoic chamber for searching correct frequency. The final test was done at a 10m open area test site with a quasi-peak detector.
EUT was placed on a non-metallic table height of 0.8m above the reference ground plane.
They were folded back and forth forming a bundle 0.3m to 0.4m long and were hanged at a 0.4m height to the ground plane.
Cables connected to EUT were fixed to cause maximum emission.
Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

### 6.2.2 Used equipments

| Equipment | Model no. | Serial no. | Makers | Next Cal. date | Used |
|---|---|---|---|---|---|
| Test receiver | ESVS 10 | 82786/006 | R&S | 04.05.13 | ☒ |
| TRILOG Broadband Antenna | VULB 9160 | 3138 | SCHWARZBECK | 05.04.10 | ☒ |
| Antenna Mast | A109 | N/A | DEAIL | - | ☒ |
| Turn Table | TS14 | N/A | DEAIL | - | ☒ |
| 10m OATS | - | - | EMC Compliance | - | ☒ |

### 6.2.3 Measurement uncertainty

Radiated Emission measurement : (K=2, 95%)
30-300 MHz : 3 m: ±3.67, 10 m: ±4.4
300-1000 MHz ; 3 m:+4.6/-2.92, 10 m:+2.94/-2.88

## 6.2.4 Test data

| Frequency [MHz] | Reading [dBuV/m] | Pol. | Height [m] | angle | Correction Factor | | Limits [dBuV/m] | Result [dBuV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Antenna | Cable | | | |
| 65.00 | 13.0 | H | 3.7 | 316 | 11.61 | 1.10 | 30.0 | 25.71 | 4.29 |
| 98.00 | 14.7 | H | 4.0 | 140 | 9.31 | 1.54 | | 25.55 | 4.45 |
| 120.00 | 8.0 | H | 4.0 | 1 | 11.30 | 1.90 | | 21.20 | 8.80 |
| 189.00 | 8.3 | H | 4.0 | 134 | 10.58 | 2.34 | | 21.22 | 8.78 |
| 197.00 | 12.7 | H | 4.0 | 110 | 10.00 | 2.38 | | 25.08 | 4.92 |
| 324.01 | 15.8 | V | 2.0 | 230 | 13.69 | 3.42 | 37.0 | 32.91 | 4.09 |
| 564.03 | 8.9 | H | 1.9 | 360 | 18.62 | 5.12 | | 32.64 | 4.36 |
| 595.99 | 6.0 | H | 4.0 | 334 | 19.41 | 5.20 | | 30.61 | 6.39 |

* Receiving Antenna Mode : *Horizontal, Vertical*

* 10 m OATS

* Note : Reading = Test Receiver meter,

P= Polarization → POL H = Horizontal, POL V = Vertical

Result = Field Strength (Antenna factor + Cable factor + Reading)

## 6.2.5. Result

Complied

# 7. Test Graph

## Conducted Emission test graph

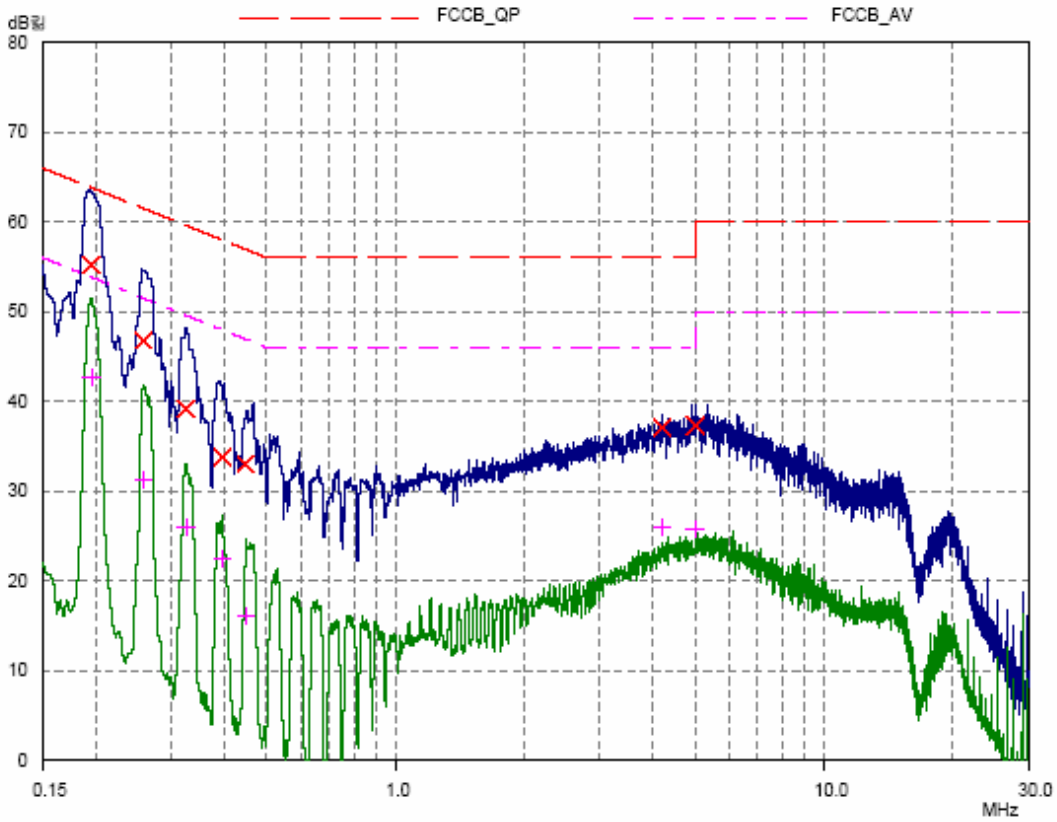
EUT: DVC
Manuf: SAMSUNG
Op Cond: H
Operator:
Test Spec: EN55022 Class B Conducted Emission
Comment: REC MODE

Result File: 050325rh.dat : SAMSUNG DVC (REC MODE) HOT

Scan Settings (2 Ranges)

| Frequencies | | | Receiver Settings | | | | | |
|---|---|---|---|---|---|---|---|---|
| Start | Stop | Step | IF BW | Detector | M-Time | Atten | Preamp | OpRge |
| 150kHz | 3MHz | 3kHz | 10kHz | PK+AV | 10msec | Auto | OFF | 60dB |
| 3MHz | 30MHz | 10kHz | 10kHz | PK+AV | 5msec | Auto | OFF | 60dB |

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Peaks: 8
Acc Margin: 25 dB



| | |
|---|---|
| EUT: | DVC |
| Manuf: | SAMSUNG |
| Op Cond: | N |
| Operator: | |
| Test Spec: | EN55022 Class B Conducted Emission |
| Comment: | REC MODE |
| Result File: | 050325m.dat : SAMSUNG DVC (REC MODE) NEUTRAL |

Scan Settings (2 Ranges)

| Frequencies | | | Receiver Settings | | | | | |
|---|---|---|---|---|---|---|---|---|
| Start | Stop | Step | IF BW | Detector | M-Time | Atten | Preamp | OpRge |
| 150kHz | 3MHz | 3kHz | 10kHz | PK+AV | 10msec | Auto | OFF | 60dB |
| 3MHz | 30MHz | 10kHz | 10kHz | PK+AV | 5msec | Auto | OFF | 60dB |

Final Measurement:

| | |
|---|---|
| Detectors: | X QP / + AV |
| Meas Time: | 1sec |
| Peaks: | 8 |
| Acc Margin: | 25 dB |