# EMI TEST REPORT

Test report no. : ERI-FCC-0111

Type of equipment : DIGITAL VIDEO CAMERA

Model no. : SCD590

Applicant. : SAMSUNG ELECTRONICS CO., LTD.

Test standards : FCC Part15 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

This equipment has been tested to comply with the requirements of FCC Rules and Regulations Part 15 Subpart B Unintentional Radiators.
The results in this report apply only to the sample tested.
This test report shall not be reproduced except in full, Without the written approval of ERI Laboratory.

Date of test: 2002. 4. 2 4 .30 Issued date: 2002. 4. 30

Tested by : GWEON, HUR approved by: S. K. Lee SANG-KYU, LEE

This laboratory is registered by KOLAS, KOREA.

This test report have been performed in accordance with Its terms of registration.

66-6, JEIL-RI, YANGJI-MYUN, YOUNGIN-CITY, KYUNGGI-DO, KOREA
TEL: 82 31 336 1186 FAX : 82 31 336 1184 homepage : www.eri.re.kr
This test report shall not be reproduced except in full, Without the written approval.

# Contents

1. client information

2. Laboratory information

3. TEST SYSTEM CONFIGURATION

3.1 Operation Environment
3.2 Measurement Uncertainty
3.3 sample calculation

4. Description of e.u.t.

4.1 Product Description
4.2 Peripherals
4.3 Used cables
4.4 E.U.T test configuration
4.5 Operating conditions

5. Test Results

5.1 Conducted Emission
5.1.1 Measurement procedure
5.1.2 Used equipments
5.1.3 Measurement uncertainty
5.1.4 test data(downloading)
5.1.5 test data(rec)
5.1.6 test data(play)
5.1.7 result


This test report shall not be reproduced except in full, Without the written approval.

5.2 Radiated Emission
5.2.1 Measurement procedure
5.2.2 Used equipments
5.2.3 measurement uncertainty
5.2.4 test data(downloading)
5.2.5 test data(rec)
5.2.6 test data(play)
5.2.7 result

6. Photographs

Conducted Emission test
Radiated Emission Test
EUT(Front, Rear, Inner)
Main Board(Front, Rear)
LCD Board(Front, Rear)


This test report shall not be reproduced except in full, Without the written approval.

# 1. Client information

| | |
|---|---|
| **Applicant** | : SAMSUNG ELECTRONIC CO., LTD |
| **Address** | : 416, Maetan-3dong, Paldal-Gu, Suwon-City, Kyungki-Do, Korea |
| **Telephone Number** | : 81-31-200-5754 |
| **Facsimile Number** | : 81-31-200-3458 |
| **Contact person** | : Kang jae soon |

| | |
|---|---|
| **Manufacturer** | : SAMSUNG ELECTRONIC CO., LTD |
| **Address** | : 416, Maetan-3dong, Paldal-Gu, Suwon-City, Kyungki-Do, Korea |
| **Telephone Number** | : 81-31-200-5754 |
| **Facsimile Number** | : 81-31-200-3458 |

# 2. Laboratory information

Address

The open area test site and EMC facilities are used for these testing.
This facility was accredited by KOLAS, EK of Korea, MIC, FCC.

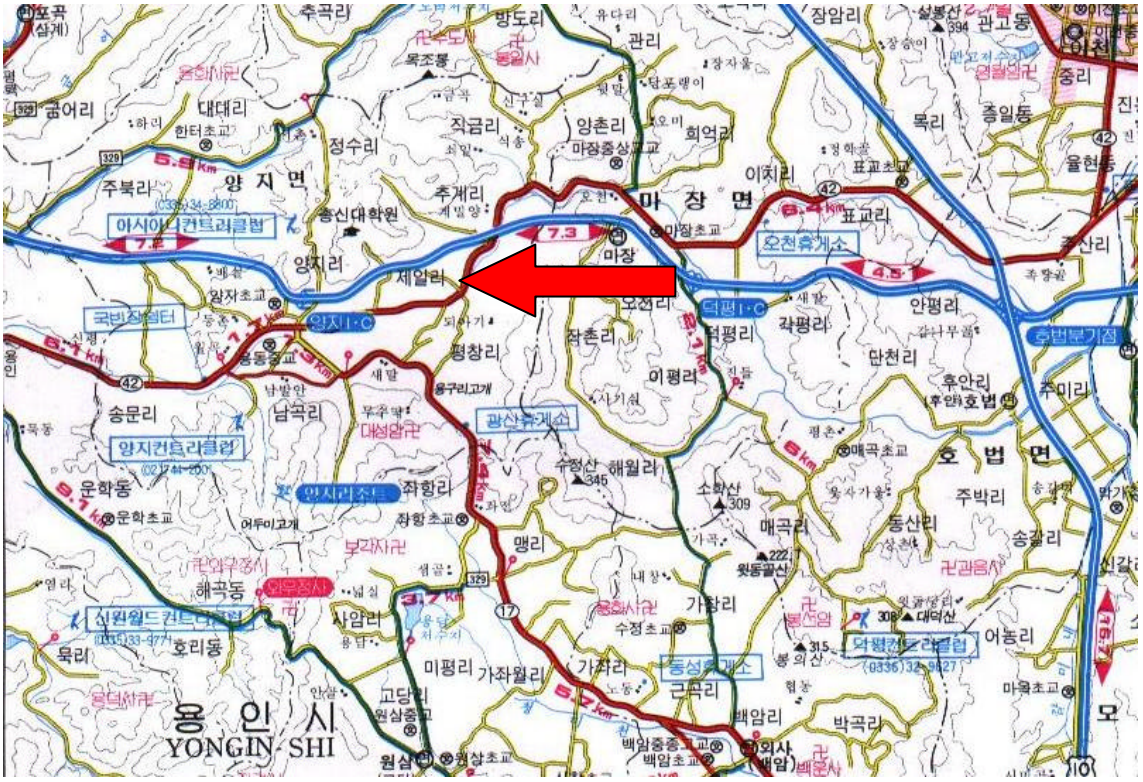
EMC RESEARCH INSTITUTE .
80, JEIL-RI, YANGJI-MYUN, YOUNGIN-CITY, KYUNGGI-DO, KOREA

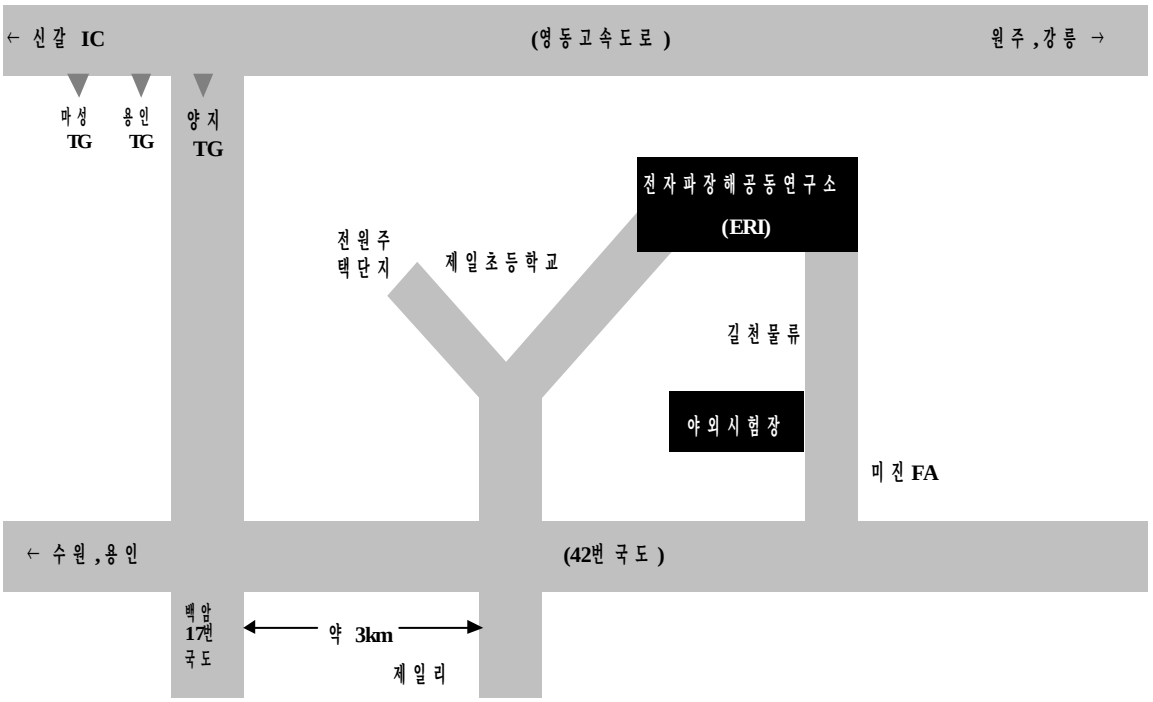
Telephone Number : 82- 31- 336- 1186
Facsimile Number : 82- 31- 336 -1184

KOLAS No. : 111
EK : J
MIC : KR0030
FCC Filing No. : 96753


This test report shall not be reproduced except in full, Without the written approval.

MAP





This test report shall not be reproduced except in full, Without the written approval.

# 3. TEST SYSTEM CONFIGURATION

## 3.1 Operation Environment

| | | Temperature | Humidity | Pressure |
|---|---|---|---|---|
| 3m OATS | : | 15.0 ° C | 34 % | 1000hPa |
| Shielded room | : | 22.0 ° C | 39 % | 998hPa |

## 3.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, specially in field of EMC.
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, mismatch, and system repeatability.

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


This test report shall not be reproduced except in full, Without the written approval.

## 3.3 sample calculation

### Conducted emission

The field strength is calculated by adding the LISN factor, cable loss from 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 by adding the antenna Factor, cable loss and, Antenna pad 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
AT = 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


This test report shall not be reproduced except in full, Without the written approval.

# 4. Description of E.U.T.

## 4.1 Product Description

| | |
|---|---|
| **Manufactured By:** | SAMSUNG ELECTRONICS CO., LTD |
| **Address:** | 416, Maetan-3dong, Paldal-Gu, Suwon City, Kyungki-Do, Korea |
| **Test Requested By:** | SAMSUNG ELECTRONICS CO., LTD |
| **Model:** | SCD590 |
| **Serial Number:** | N/A |
| **IMAGE SENSOR** | 200,000 fixel |
| **POWER CONSUMPTION** | 4.9W(LCD), 3.6W(CVF) |
| **Supply Voltage** | DC 8.4V , Lithium Lon Battery Pack 7.4V |
| **General Description:** | This EUT(Equipment Under Test) is DIGITAL VIDEO CAMERA. |

## 4.2 peripherals

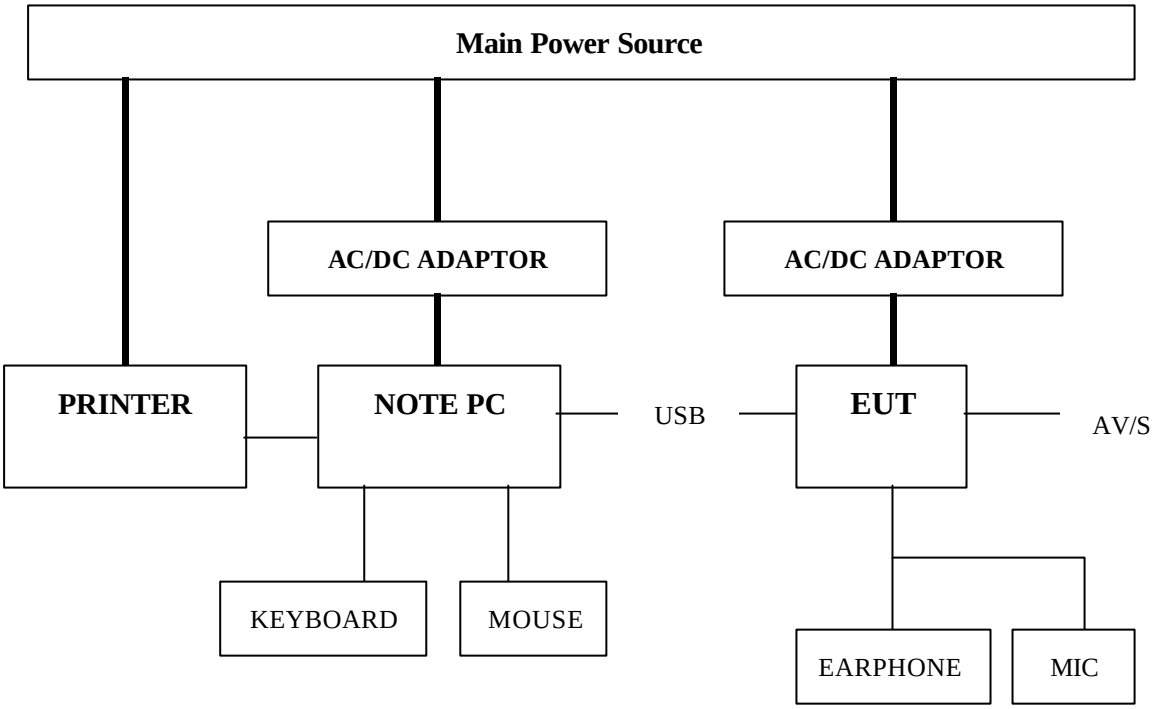
| Description | Model / Part # | Serial Number | Manufacture |
|---|---|---|---|
| DIGITAL VIDEO CAMERA | SCD590 | N/A | SAMSUNG ELECTRONICS CO., LTD. |
| PRINTER | C6427A | CN13B1B1TD | HP |
| KEYBOARD | SDM4510UH | 4M015720 | SAMSUNG ELECTRONICS CO., LTD. |
| MOUSE | M-S34 | LZB92800974 | LOGITECH |
| NOTE PC | CM2080 | 5Y17JNZ9R892 | SAMSUNG ELECTRONICS CO., LTD. |
| AC/DC ADAPTOR | AA-E7 | 6CAT3 00066 | SAMSUNG ELECTRONICS CO., LTD. |
| MIC, EARPHONE | N/A | N/A | N/A |
| AC/DC ADAPTOR | AD-60DB | MJD0124008757 | LG ELECTRONICS CO., LTD. |

## 4.3 used cables

| EUT Port | Type | Shield (Y/N) | Length (meters) | Pin | Connected To |
|---|---|---|---|---|---|
| USB | USB | Y | 1.0 | 5 | NOTE PC |
| | | | | | |
| | | | | | |


This test report shall not be reproduced except in full, Without the written approval.

## 4.4 E.U.T Test Configuration




## 4.5 Operating conditions

Operating : USB Still camera mode, play mode, recording mode

- The system was configured in typical fashion (as a customer would normally use it) for testing.
- The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.


This test report shall not be reproduced except in full, Without the written approval.

# 5. TEST RESULTS

## 5.1 Conducted emission

### 5.1.1 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 40Cm to the vertical conducted plane.
All other surfaces of tabletop was at least 80cm from any other grounded conducting surface.
I/O cables and AC cables that were connected to the peripherals were bundled in center.
They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.
Each EUT power lead, except ground (safety) lead, were individually connected through a LISN to input power source.
Both lines of power cord, hot and neutral, were measured.

### 5.1.2 Used equipment

| Equipment | Model | Serial No. | Makers | Next Cal.Date | Used |
|---|---|---|---|---|---|
| Test receiver | ESS | 848588/006 | R&S | 02. 6. 08 | x |
| | ESCS30 | 100022 | R&S | 03. 3. 25 | |
| L.I.S.N. | ESH3-Z5 | 100028 | R&S | 02. 5. 21 | x |
| | ESH3-Z5 | 100029 | R&S | 01.5. 21 | x |

### 5.1.3 measurement uncertainty

Conducted Emission measurement : ± 2.4 (K=2)


This test report shall not be reproduced except in full, Without the written approval.

## 5.1.4 test data(downloading)

| Frequency Range [MHz] | Tested Freq. [MHz] | LISN Pol. | Meter Reading[A] QP [dBuV] | Total Loss [B] [dB] | Results QP [A]+[B] [dBuV] | Margin [C]-[A+B] [dBuV] | Limits [C] [dBuV] |
|---|---|---|---|---|---|---|---|
| **0.45-30** | 0.459 | H | 42.10 | 0.18 | 42.28 | 5.72 | **48.00** |
| | 0.525 | N | 42.20 | 0.18 | 42.38 | 5.62 | **48.00** |
| | 0.591 | H | 43.30 | 0.18 | 43.48 | 4.52 | **48.00** |
| | 0.855 | N | 40.20 | 0.18 | 40.38 | 7.62 | **48.00** |
| | 1.116 | H | 40.30 | 0.19 | 40.49 | 7.51 | **48.00** |
| | 1.446 | N | 40.10 | 0.20 | 40.30 | 7.70 | **48.00** |
| | 1.512 | N | 40.30 | 0.20 | 40.50 | 7.50 | **48.00** |
| | 1.710 | H | 40.30 | 0.21 | 40.51 | 7.49 | **48.00** |
| | 1.773 | H | 40.90 | 0.21 | 41.11 | 6.89 | **48.00** |
| | 1.971 | N | 43.00 | 0.22 | 43.22 | 4.78 | **48.00** |
| | 2.037 | N | 42.20 | 0.22 | 42.42 | 5.58 | **48.00** |
| | 2.430 | H | 40.80 | 0.23 | 41.03 | 6.97 | **48.00** |
| | 2.628 | N | 40.3 | 0.24 | 40.54 | 7.46 | **48.00** |
| | 3.090 | H | 40.3 | 0.25 | 40.55 | 7.45 | **48.00** |
| | 3.350 | N | 40.3 | 0.26 | 40.56 | 7.44 | **48.00** |
| | | | | | | | |
| | | | | | | | |

* Results = Meter Reading(QP) + Total Loss(LISN Insertion loss + Cable loss)

* Margin = Limits - Result

* IF Bandwidth = 9kHz

* Detecting Mode : Quasi-Peak

* Used receiver : ESS (Rohde & Schwarz)


This test report shall not be reproduced except in full, Without the written approval.

## 5.1.5 test data(rec)

| Frequency Range [MHz] | Tested Freq. [MHz] | LISN Pol. | Meter Reading[A] QP [dBuV] | Total Loss [B] [dB] | Results QP [A]+[B] [dBuV] | Margin [C]-[A+B] [dBuV] | Limits [C] [dBuV] |
|---|---|---|---|---|---|---|---|
| **0.45-30** | 0.525 | H | 42.40 | 0.18 | 42.58 | 5.42 | **48.00** |
| | 0.789 | N | 41.00 | 0.18 | 41.18 | 6.82 | **48.00** |
| | 1.380 | N | 40.70 | 0.20 | 40.90 | 7.10 | **48.00** |
| | 1.971 | N | 43.50 | 0.22 | 43.72 | 4.28 | **48.00** |
| | 2.037 | H | 42.30 | 0.22 | 42.52 | 5.48 | **48.00** |
| | 3.090 | N | 40.40 | 0.25 | 40.65 | 7.35 | **48.00** |
| | 4.140 | N | 40.10 | 0.38 | 40.48 | 7.52 | **48.00** |
| | 4.730 | H | 39.50 | 0.40 | 39.90 | 8.10 | **48.00** |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

* Results = Meter Reading(QP) + Total Loss(LISN Insertion loss + Cable loss)

* Margin = Limits - Result

* IF Bandwidth = 9kHz

* Detecting Mode : Quasi-Peak

* Used receiver : ESS (Rohde & Schwarz)


This test report shall not be reproduced except in full, Without the written approval.

## 5.1.6 test data(play)

| Frequency Range | Tested Freq. | LISN Pol. | Meter Reading[A] QP | Total Loss [B] | Results QP [A]+[B] | Margin [C]-[A+B] | Limits [C] |
|---|---|---|---|---|---|---|---|
| [MHz] | [MHz] | | [dBuV] | [dB] | [dBuV] | [dBuV] | [dBuV] |
| **0.45-30** | 0.525 | H | 43.30 | 0.18 | 43.48 | 4.52 | **48.00** |
| | 0.591 | N | 40.80 | 0.18 | 40.98 | 7.02 | **48.00** |
| | 0.855 | H | 40.70 | 0.18 | 40.88 | 7.12 | **48.00** |
| | 1.446 | H | 40.30 | 0.20 | 40.50 | 7.50 | **48.00** |
| | 1.512 | H | 40.30 | 0.20 | 40.50 | 7.50 | **48.00** |
| | 1.971 | H | 42.20 | 0.22 | 42.42 | 5.58 | **48.00** |
| | 2.037 | H | 42.20 | 0.22 | 42.42 | 5.58 | **48.00** |
| | 2.628 | N | 40.10 | 0.24 | 40.34 | 7.66 | **48.00** |
| | 3.680 | N | 39.90 | 0.36 | 40.26 | 7.74 | **48.00** |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

* Results = Meter Reading(QP) + Total Loss(LISN Insertion loss + Cable loss)
* Margin = Limits - Result
* IF Bandwidth = 9kHz
* Detecting Mode : Quasi-Peak
* Used receiver : ESS (Rohde & Schwarz)

## 5.1.7 Result

Complied


This test report shall not be reproduced except in full, Without the written approval.

## 5.2 Radiated Emission

### 5.2.1 Measurement procedure

A pretest was performed at 3m distance in an 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.
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.

### 5.2.2 Used equipment

| Equipment | Model No. | Serial No. | Makers | Next Cal Date |
|---|---|---|---|---|
| Test receiver | ESMI | 826210/007 | R&S | 03. 3. 8 |
| | ESCS30 | 830986/015 | R&S | 03.3.18 |
| | ESS | 848588/006 | R&S | 02.6. 8 |
| Biconnical antenna | HK116 | 825177/013 | R&S | 02. 5. 30 |
| Log-Periodic antenna | HL223 | 825032/017 | R&S | 02. 5. 30 |
| Antenna Mast | EMAT2014 | N/A | EM | - |
| Turn Table | EMRT2015 | N/A | EM | - |
| Test site | 10m chamber | Test site | EM | - |
| | chamber(3m) | | EM | - |

### 5.2.3 measurement uncertainty

Radiated Emission measurement :

30-300MHz +3.96dB / -4.04dB
300-1000MHz +3.04dB / -3.00dB


This test report shall not be reproduced except in full, Without the written approval.

## 5.2.4 test data(downloading)

| Frequency Range [MHz] | Tested Frequency [MHz] | ANT Pol. | Meter Reading [A] [dBuV/m] | Total Loss [B] [dB] | Results [A+B] [dBuV/m] | Margine | Limits [dBuV/m] |
|---|---|---|---|---|---|---|---|
| ***30 - 88*** | 47.95 | H | 5.60 | 12.45 | 18.05 | 21.95 | **40.0** |
| | 72.19 | V | 16.40 | 7.66 | 24.06 | 15.94 | |
| | | | | | | | |
| | | | | | | | |
| ***88-216*** | 162.58 | H | 5.90 | 17.99 | 23.89 | 19.61 | **43.5** |
| | 187.67 | H | 5.40 | 19.10 | 24.50 | 19.00 | |
| | 202.51 | H | 6.50 | 18.99 | 25.49 | 18.01 | |
| | 214.24 | H | 4.00 | 19.20 | 23.20 | 20.30 | |
| | | | | | | | |
| | | | | | | | |
| ***216-960*** | 269.28 | H | 8.80 | 21.30 | 30.10 | 15.90 | **46.0** |
| | 286.41 | H | 9.00 | 21.95 | 30.95 | 15.05 | |
| | 433.52 | H | 8.70 | 20.94 | 29.64 | 16.36 | |
| | 450.21 | V | 11.00 | 20.94 | 31.94 | 14.06 | |
| | 559.78 | H | 8.00 | 23.16 | 31.16 | 14.84 | |
| | 721.35 | H | 6.70 | 25.78 | 32.48 | 13.52 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| ***960-above*** | | | | | | | **54.0** |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |


This test report shall not be reproduced except in full, Without the written approval.

## 5.2.5 test data(rec)

| Frequency Range [MHz] | Tested Frequency [MHz] | ANT Pol. | Meter Reading [A] [dBuV/m] | Total Loss [B] [dB] | Results [A+B] [dBuV/m] | Margine | Limits [dBuV/m] |
|---|---|---|---|---|---|---|---|
| ***30 - 88*** | | | | | | | **40.0** |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| ***88-216*** | 88.59 | H | 17.20 | 9.96 | 27.16 | 16.34 | **43.5** |
| | 90.14 | V | 16.50 | 10.62 | 27.12 | 16.38 | |
| | 149.12 | H | 9.50 | 17.19 | 26.69 | 16.81 | |
| | 198.10 | H | 4.70 | 18.99 | 23.69 | 19.81 | |
| | | | | | | | |
| | | | | | | | |
| ***216-960*** | 216.28 | H | 8.50 | 19.40 | 27.90 | 18.10 | **46.0** |
| | 232.49 | H | 9.00 | 19.70 | 28.70 | 17.30 | |
| | 265.67 | H | 8.10 | 20.80 | 28.90 | 17.10 | |
| | 366.71 | V | 8.20 | 18.11 | 26.31 | 19.69 | |
| | 492.62 | V | 6.50 | 21.64 | 28.14 | 17.86 | |
| | 645.90 | H | 10.20 | 25.26 | 35.46 | 10.54 | |
| | 810.97 | H | 5.90 | 27.61 | 33.51 | 12.49 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| ***960-above*** | | | | | | | **54.0** |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |


This test report shall not be reproduced except in full, Without the written approval.

## 5.2.6 test data(play)

| Frequency Range [MHz] | Tested Frequency [MHz] | ANT Pol. | Meter Reading [A] [dBuV/m] | Total Loss [B] [dB] | Results [A+B] [dBuV/m] | Margine | Limits [dBuV/m] |
|---|---|---|---|---|---|---|---|
| ***30 - 88*** | 48.21 | H | 6.90 | 13.90 | 20.80 | 22.70 | **40.0** |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| ***88-216*** | 88.15 | H | 13.90 | 10.06 | 23.96 | 22.04 | **43.5** |
| | 110.46 | H | 10.30 | 13.69 | 23.99 | 22.01 | |
| | 165.31 | H | 7.90 | 18.20 | 26.10 | 19.90 | |
| | 172.02 | V | 5.70 | 18.26 | 23.96 | 22.04 | |
| | 214.27 | H | 5.10 | 19.30 | 24.40 | 21.60 | |
| | | | | | | | |
| ***216-960*** | 234.53 | H | 5.70 | 19.90 | 25.60 | 20.40 | **46.0** |
| | 298.27 | V | 9.30 | 22.53 | 31.83 | 14.17 | |
| | 308.14 | V | 9.20 | 17.40 | 26.60 | 19.40 | |
| | 449.79 | V | 8.60 | 20.07 | 28.67 | 17.33 | |
| | 614.15 | V | 5.90 | 24.00 | 29.90 | 16.10 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| ***960-above*** | | | | | | | **54.0** |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

## 5.2.7 Result

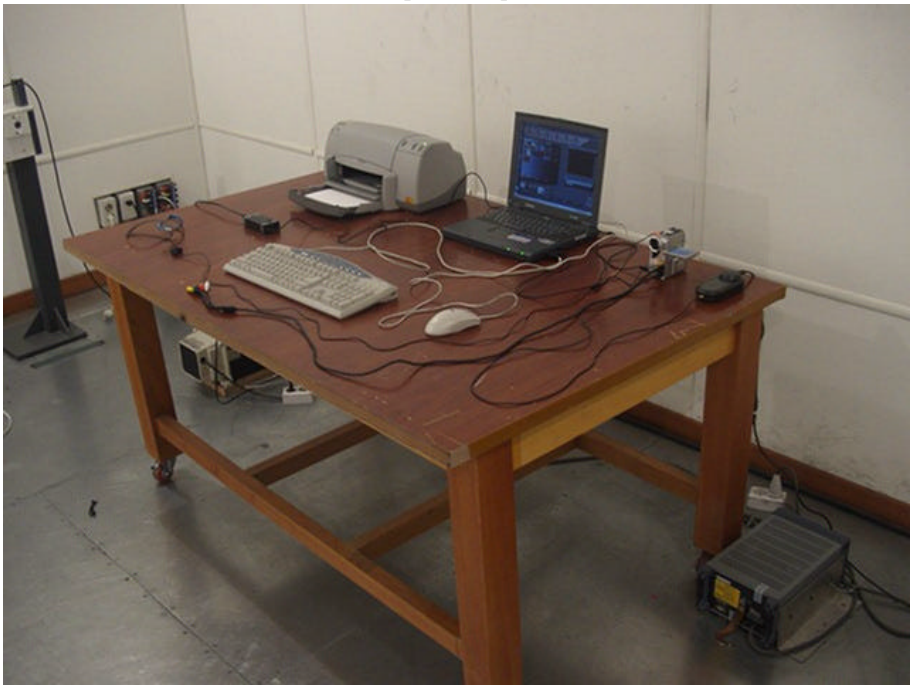
Complied


This test report shall not be reproduced except in full, Without the written approval.

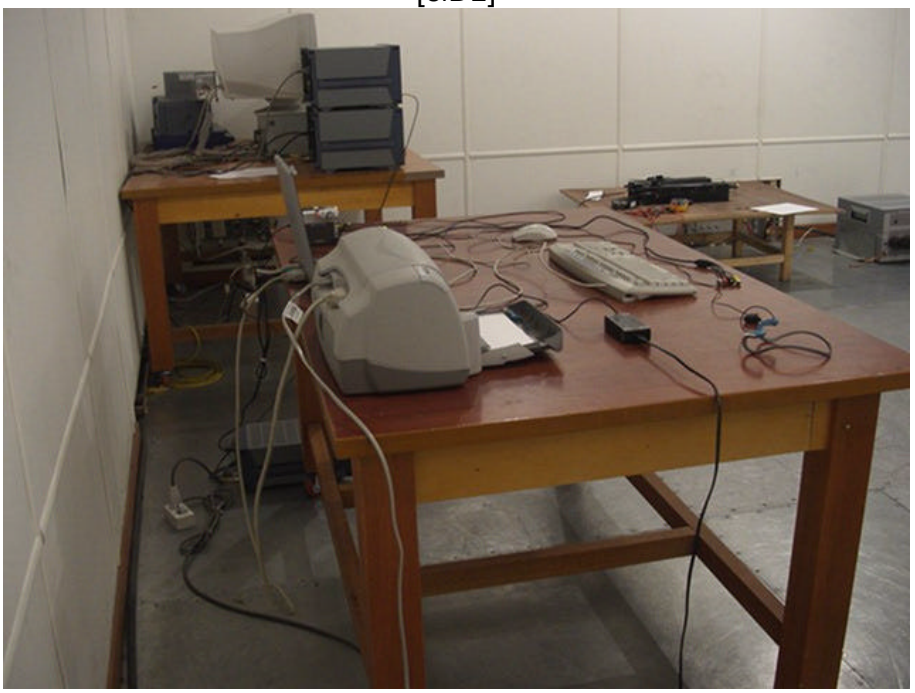
# 6. TEST PHOTOGRAPHS

## Conducted Emission

[FRONT]



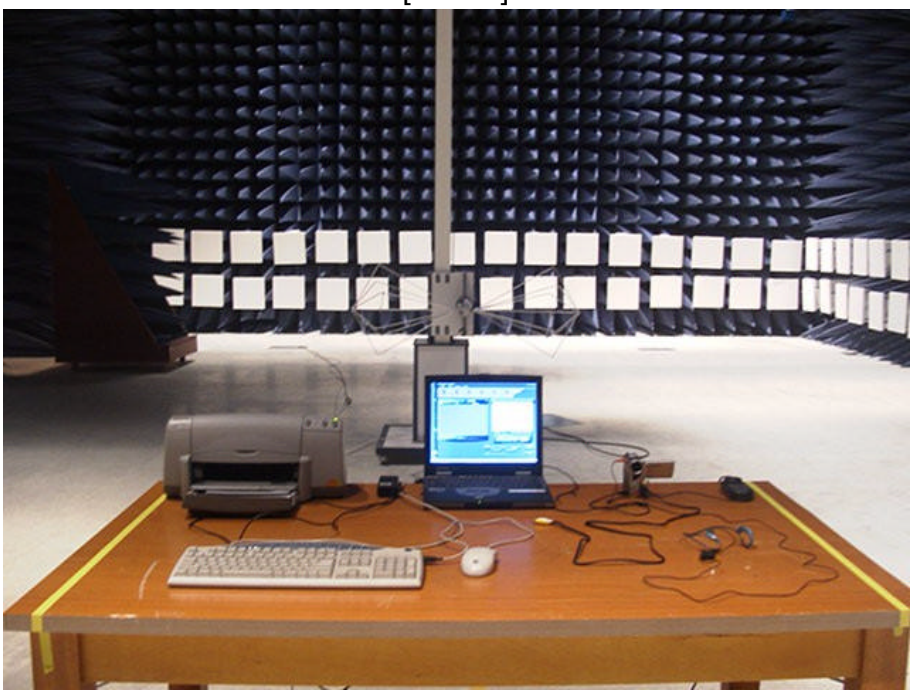
[SIDE]



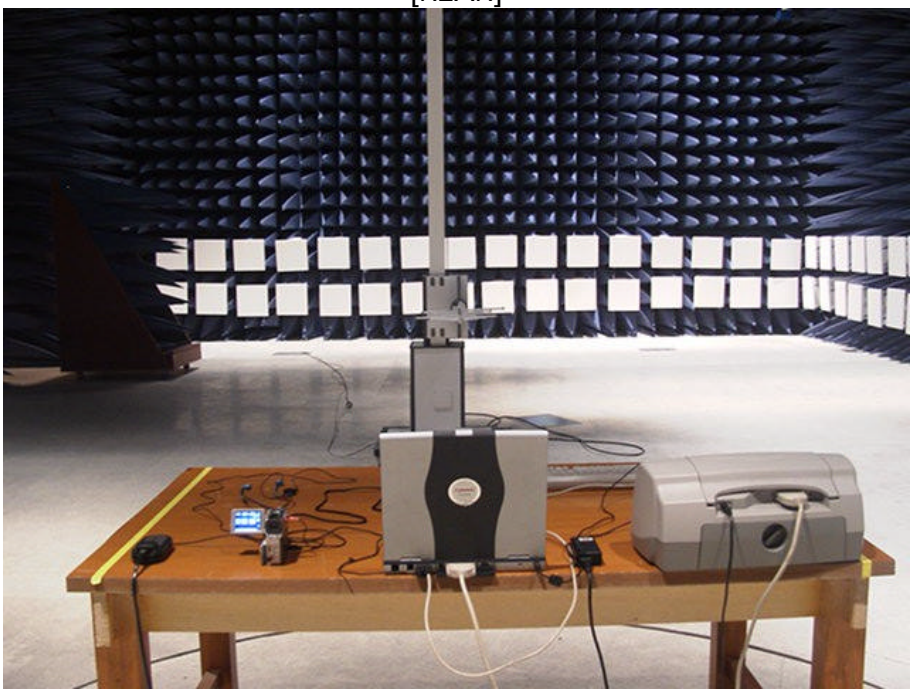

This test report shall not be reproduced except in full, Without the written approval.

## Radiated Emission

[FRONT]



[REAR]



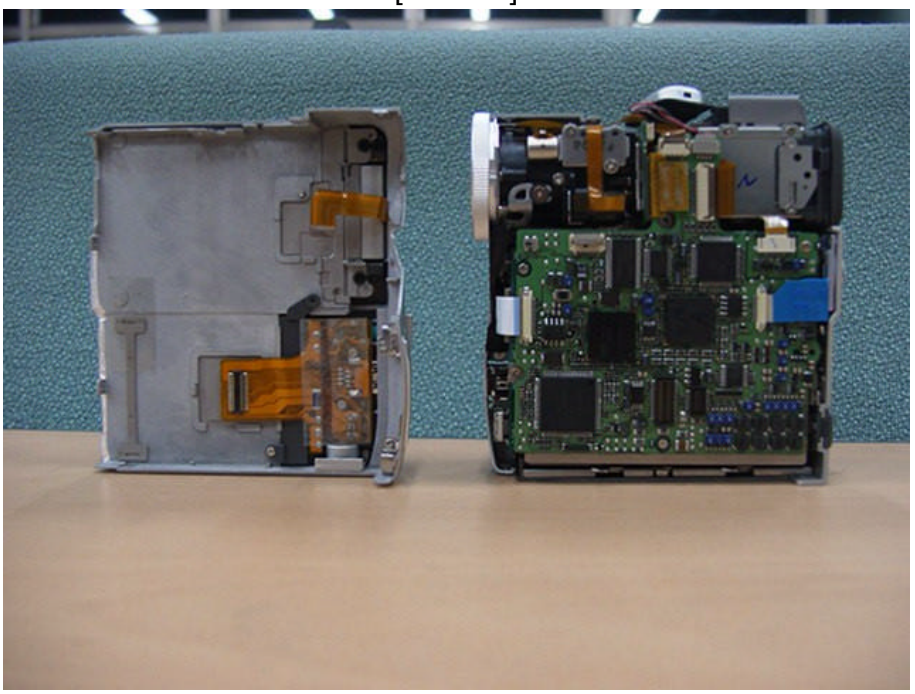

This test report shall not be reproduced except in full, Without the written approval.

[ EUT FRONT]

[ EUT REAR ]

This test report shall not be reproduced except in full, Without the written approval.

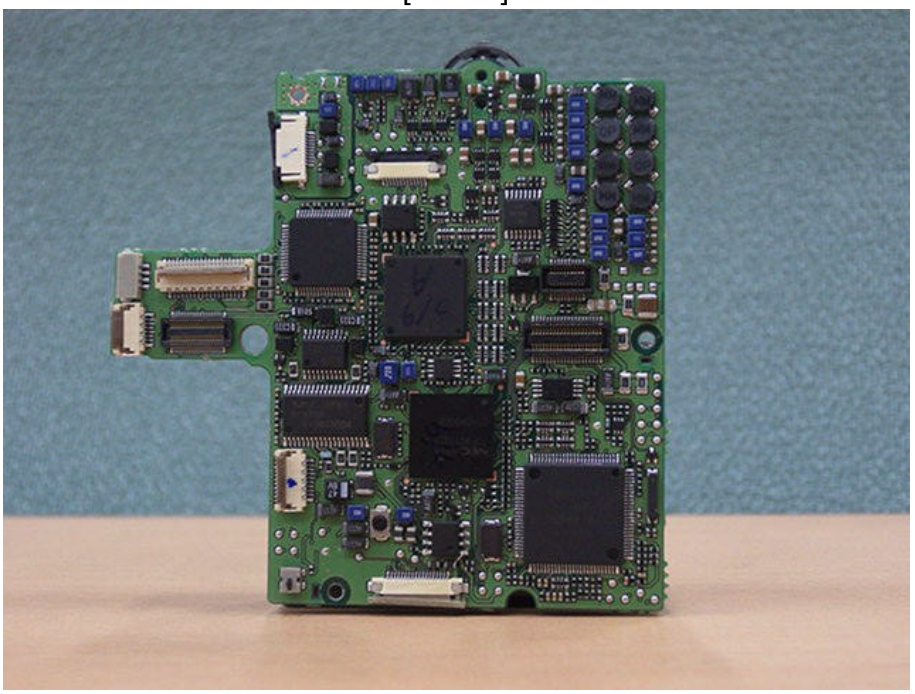
[ INSIDE ]



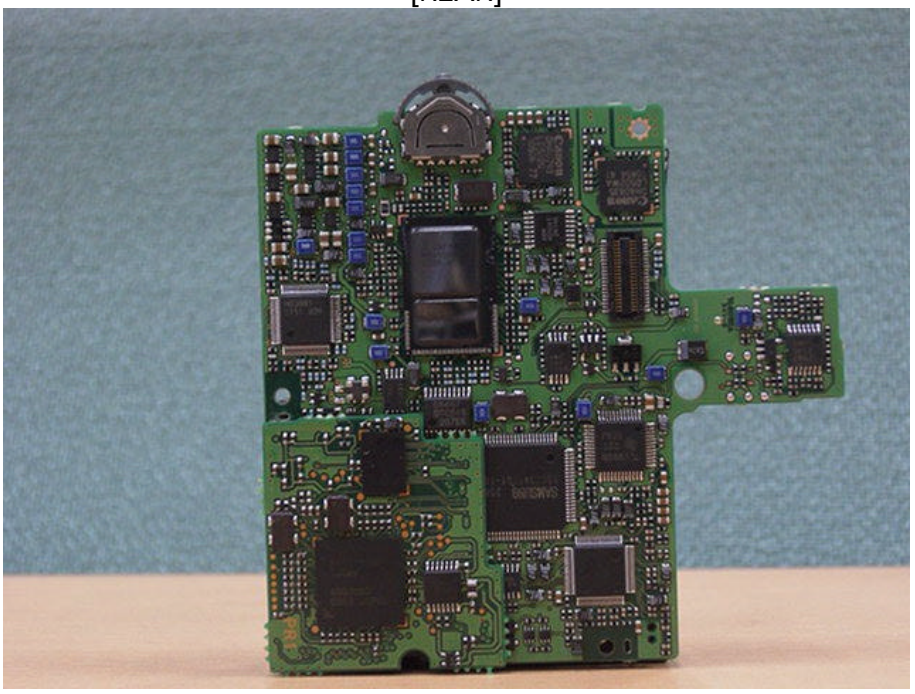

This test report shall not be reproduced except in full, Without the written approval.

## Main Board

[FRONT]



[REAR]

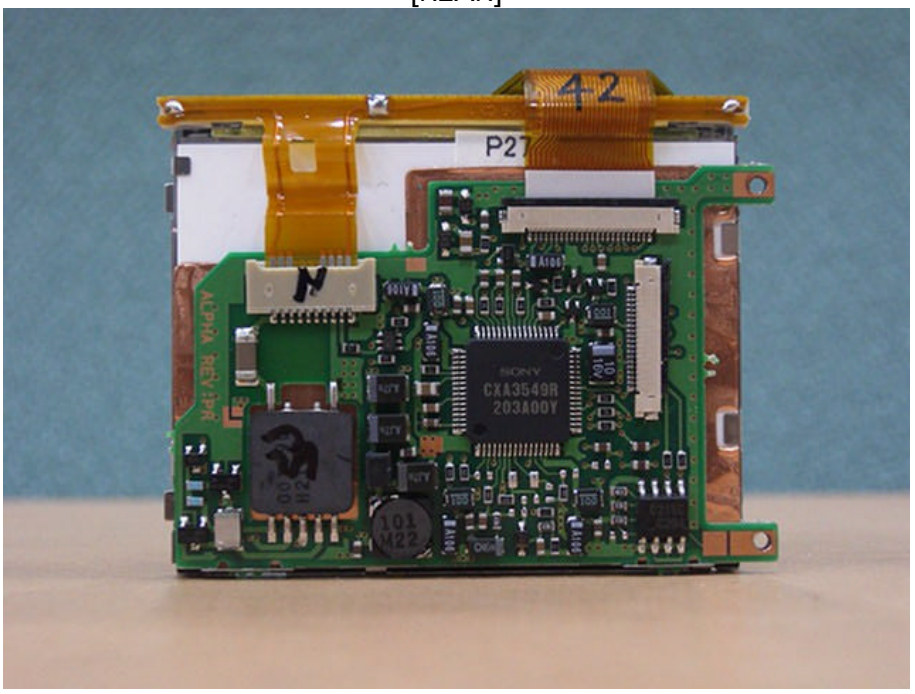



This test report shall not be reproduced except in full, Without the written approval.

LCD Board

[FRONT]

[REAR]





This test report shall not be reproduced except in full, Without the written approval.

파일 이름: SCD590(FCC-0111)
폴더: C:\FCC TCB
서식 파일: C:\WINDOWS\Application Data\Microsoft\Templates\Normal.dot
제목:
주제:
만든 이: 윤예선
키워드:
메모:
만든 날짜: 02-04-18 오전 11:41
수정 횟수: 10
마지막으로 저장한 날짜: 02-04-30 오후 9:34
마지막으로 저장한 사람: 김경민
전체 편집 시간: 58 분
마지막으로 인쇄한 날짜: 02-04-30 오후 9:35
문서량
페이지 수: 23
단어 수: 1,907 (약)
문자 수: 10,871 (약)