

# EMC TEST REPORT

## Samsung Electronics CS Management Center

416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do,

443-742 Korea

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NVLAP Code : 200623-0



### 1. Applicant

◦ Name : Samsung Electronics Co., Ltd. DVS Division

◦ Address : 416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, 443-742 Korea

### 2. Purpose for the report : Approval for EMC

### 3. EUT

1) Product name : Digital Camcorder

2) Model name : SC-D965

3) Brand name : Samsung

4) Variant model : SC-D963

4. Date of test : 2006. 03. 17 ~ 2006. 03. 23

5. Applied standards : FCC Part 15:2003 Subpart B

6. Report No. : LBE060910 Issue 1

7. FCC ID : A3L06OASIS

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

Prepared by

Name : Tae Young, Jang

A handwritten signature in black ink, appearing to read 'T. Young Jang'.

Authorised by

Name : No Cheon, Park

A handwritten signature in black ink, appearing to read 'N. C. Park'.

This report is the test result about the sphere accredited by KOLAS which signed the Mutual Recognition Arrangement of International Laboratory Accreditation Cooperation.

2006. 03. 27

**Samsung Electronics Co., Ltd.**  
**CS Management Center**

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## 1. General information

### 1.1 Operating mode and condition

The system was configured for testing in typical fashion use.

All connectors not used are terminated with resistors matching the nominal terminal impedance.

The mode of operation utilized for testing was selected to best simulate typical EUT use

### 1.2 EUT modifications

No EUT modifications were required.

### 1.3 Details of sampling

Client selected, single unit

### 1.4 Test configuration

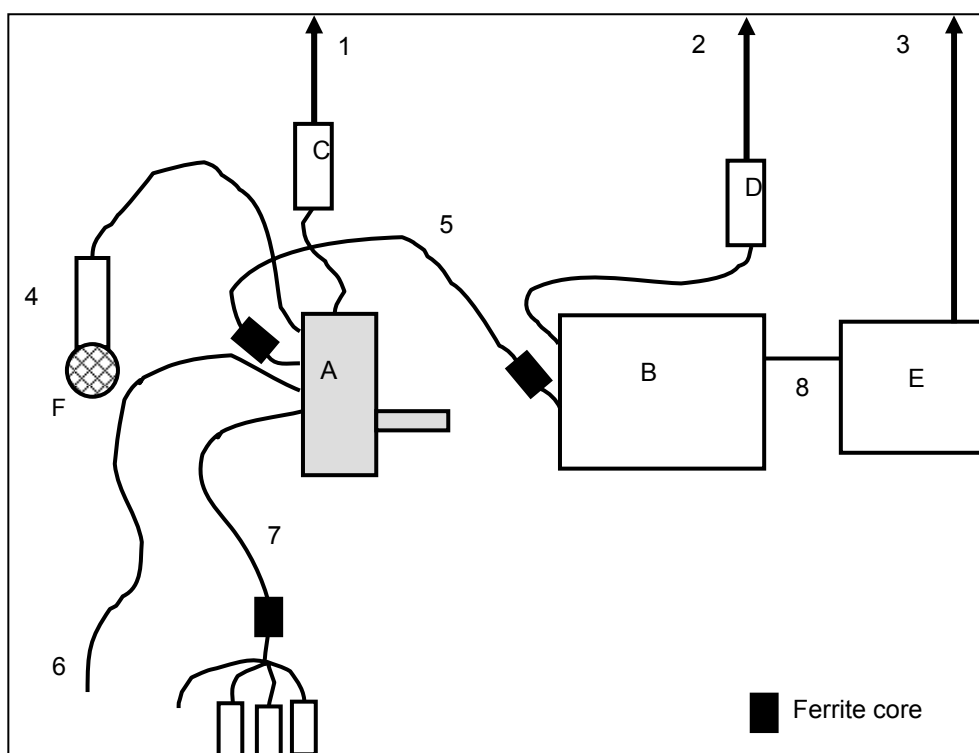
#### 1.4.1 Used EUT and peripherals

| Seq | Item              | Model No.  | Serial No.               | Manufacturer | Note    |
|-----|-------------------|------------|--------------------------|--------------|---------|
| A   | Digital camcorder | SC-D965    | -                        | SAMSUNG      | EUT     |
| B   | Note PC           | REV X03    | CN-0G6951-36521-4B6-0020 | DELL         | DoC     |
| C   | Adapter           | AA-E8      | 6CAY2 00385              | SAMSUNG      | For EUT |
| D   | Adapter           | ADP-50HH   | CN-006166-48661-4CK-00VX | DELL         | For PC  |
| E   | Printer           | 1100       | CN-0J9342-72215-53M-0043 | DELL         | DoC     |
| F   | MIC               | YMC - 2521 | -                        | SAMSUNG      | DoC     |

#### 1.4.2 Used cable description

| No | Connect Cable | Length [m] | Shielded [Y/N] | Remark  |
|----|---------------|------------|----------------|---------|
| 1  | Power         | 2.0        | No             | EUT     |
| 2  | Power         | 1.8        | Yes            | Note PC |
| 3  | Power         | 1.8        | Yes            | Printer |
| 4  | MIC           | 4.0        | No             | -       |
| 5  | 1394          | 1.8        | Yes            | -       |
| 6  | USB           | 1.8        | Yes            | -       |
| 7  | AV            | 1.8        | Yes            | -       |

#### 1.4.3 Block diagram



## 1.5 Applied standards

| Test standard             | Test method      |
|---------------------------|------------------|
| FCC Part15:2003 Subpart B | ANSI C63.4: 2003 |

## 1.6 Power input ports

The following data details the supply levels at which the EUT was operated during tests.

| Designation | Frequency (Hz) | Voltage (V) |
|-------------|----------------|-------------|
| Mains lead  | 50             | 120         |

## 1.7 Specification

| System                 |                                                                              |
|------------------------|------------------------------------------------------------------------------|
| Video signal           | NTSC                                                                         |
| Video recording system | 2 rotary heads, Helical scanning system                                      |
| Audio recording system | Rotary heads, 12/16b PCM system                                              |
| Usable cassette        | Digital video tape (6.35mm width): Mini DV cassette                          |
| Tape speed             | SP: approx. 18.81mm/s LP: approx. 12.56mm/s                                  |
| Tape recording time    | SP: 60 minutes (when using DVM 60),<br>LP: 90 minutes (when using DVM 60)    |
| FF/REW time            | Approx. 150 sec. (using DVM60 tape)                                          |
| Image device           | CCD (Charge Coupled Device) (1MEGA pixels)                                   |
| Lens                   | F1.6 26x, 1200x (Digital) Electronic zoom lens                               |
| Filter diameter        | Ø27                                                                          |
| LCD Screen/Viewfinder  |                                                                              |
| Size/dot number        | 2.5inch 112K (SC-D963 only) /<br>2.7inch (wide) 230K (SC-D965 only)          |
| LCD Screen Method      | TFT LCD                                                                      |
| Viewfinder             | Color LCD                                                                    |
| Connectors             |                                                                              |
| Video output           | 1Vp-p (75Ω terminated)                                                       |
| S-video output         | Y: 1Vp-p, 75Ω, C: 0.286Vp-p, 75Ω                                             |
| Audio output           | -7.5dBs (600Ω terminated)                                                    |
| DV input/output        | 4pin special in/out connector                                                |
| USB output             | Mini-B type connector                                                        |
| External mic           | Ø3.5 stereo                                                                  |
| General                |                                                                              |
| Power source           | DC 8.4V, Lithium Ion Battery Pack 7.4V                                       |
| Power source type      | Lithium Ion Battery Pack, Power supply (100V~240V) 50/60Hz                   |
| Power consumption      | 3.9W(LCD), 3.7W(Viewfinder) (SC-D963 only)                                   |
| (Recording)            | 4.1W(LCD), 3.9W(Viewfinder) (SC-D965 only)                                   |
| Operating temperature  | 0°~40°C (32°F~104°F)                                                         |
| Storage temperature    | -20°C ~ 60°C (-4°F ~ 140°F)                                                  |
| External dimension     | Height 3.62inches(93mm), Length 4.63inches(105mm),<br>Width 2.52inches(53mm) |
| Weight                 | 0.904lb (350g, 14.46oz) (Except for Lithium Ion Battery<br>Pack and tape)    |
| Internal MIC           | Omni-directional stereo microphone                                           |
| Remote control         | Indoors: greater than 49ft(15m) (straight line),                             |
| (SC-D965 only)         | Outdoors: about 16.4ft(5m) (straight line)                                   |

## 2. Summary of test results

**Result : Complied**

The equipment under test(EUT) has been found to comply with the applied standards.

| Test Item                     |                    | Applied Standard          | Results  |
|-------------------------------|--------------------|---------------------------|----------|
| Electromagnetic Emission Test |                    |                           |          |
| 3.1                           | Conducted Emission | FCC Part15:2003 Subpart B | Complied |
| 3.2                           | Radiated Emission  | FCC Part15:2003 Subpart B | Complied |

### 3. Description of individual tests

#### 3.1 Conducted emission

##### 3.1.1 Test information

|                   |                                                                                             |
|-------------------|---------------------------------------------------------------------------------------------|
| Test engineer     | Tae Young, Jang                                                                             |
| Test date         | March 23, 2006                                                                              |
| Climate condition | Ambient temperature : 23.1 °C, Relative humidity : 28 %<br>Atmospheric pressure : 100.7 kPa |
| Test place        | Shielded room # 1                                                                           |

##### 3.1.2 Test equipment

| Equipment            | Model Name | Manufacturer | Serial No. | Calibration |                 |
|----------------------|------------|--------------|------------|-------------|-----------------|
|                      |            |              |            | Date        | Interval(Month) |
| Field strength meter | ESCI       | R&S          | 100136     | 2005-04-17  | 12              |
| LISN                 | ENV216     | R&S          | 100116     | 2005-09-08  | 12              |
| Test Software        | EMC 32     | R&S          | Ver 4.40.0 | N/A         | N/A             |

#### EUT Test Setup

The EUT was set up as per normal use on a wooden table, 0.4 m from a vertical ground reference plane, At least 0.8 m from other conduction surfaces and 0.8 m from the LISN.





|                                |                                                                                               |
|--------------------------------|-----------------------------------------------------------------------------------------------|
| <b>Measurement<br/>Results</b> | Complied<br>The measured emissions of the EUT have found to be below<br>the specified limits. |
|--------------------------------|-----------------------------------------------------------------------------------------------|

|                    |
|--------------------|
| <b>Uncertainty</b> |
|--------------------|

3.30 dB $\mu$ V (95 % C.L, k=2)

**Test Data**

■ Operating Mode : Mass storage (USB)

## Test Information

EUT Name: SC-D965  
Serial Number:  
Test Description:  
Operating Conditions: Mass storage  
Operator Name:  
Comment: USB

## Hardware Setup: Voltage with 2-Line-LISN - [EMI conducted]

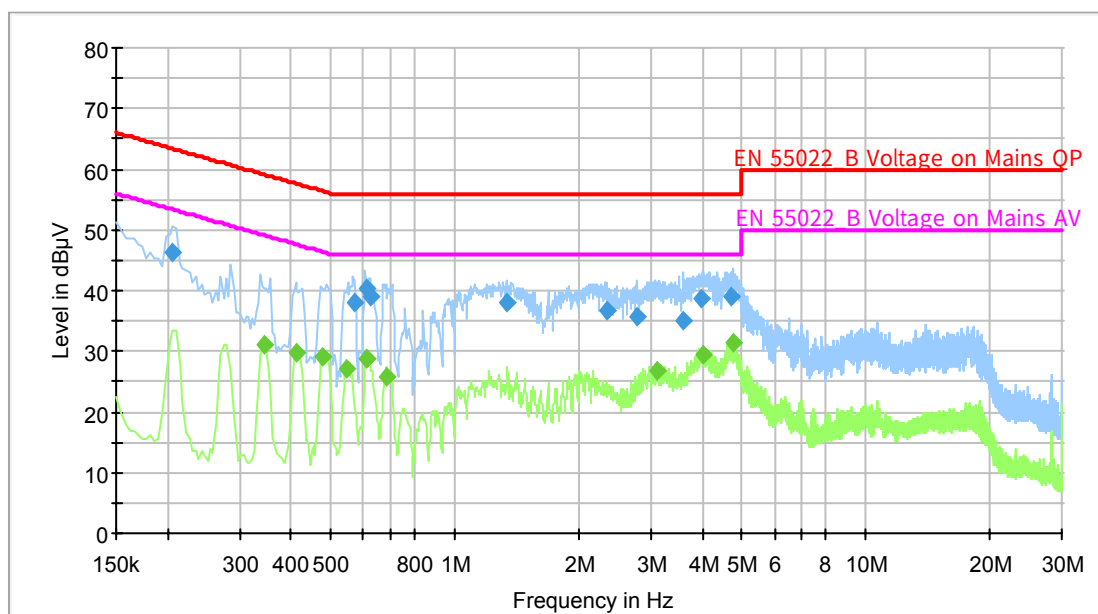
Subrange 1  
Frequency Range: 150kHz - 30MHz  
Receiver: ESCI 3  
Transducer: ENV216 / Receiver-2-Line-LISN ENV216

## Scan Setup: EN55022\_B\_2-Line-LISN fin [EMI conducted]

Hardware Setup: Voltage with 2-Line-LISN  
Level Unit: dB  $\mu$ V

| Subrange       | Detectors          | IF Bandwidth | Meas. Time | Receiver |
|----------------|--------------------|--------------|------------|----------|
| 150kHz - 30MHz | QuasiPeak; Average | 9kHz         | 5s         | ESCI 3   |

## [Graph and Data]



[ Quasi Peak ]

| Frequency (MHz) | QuasiPeak (dB $\mu$ V) | Line | Corr. (dB) | Margin (dB) | Limit (dB $\mu$ V) |
|-----------------|------------------------|------|------------|-------------|--------------------|
| 0.207           | 46.183                 | L1   | 9.570      | 17.162      | 63.345             |
| 0.568           | 37.881                 | N    | 9.570      | 18.119      | 56.000             |
| 0.612           | 40.247                 | N    | 9.570      | 15.753      | 56.000             |
| 0.625           | 38.905                 | N    | 9.570      | 17.095      | 56.000             |
| 1.340           | 37.999                 | N    | 9.574      | 18.001      | 56.000             |
| 2.338           | 36.579                 | N    | 9.587      | 19.421      | 56.000             |
| 2.766           | 35.720                 | N    | 9.594      | 20.280      | 56.000             |
| 3.594           | 34.973                 | N    | 9.606      | 21.027      | 56.000             |
| 3.999           | 38.564                 | N    | 9.610      | 17.436      | 56.000             |
| 4.732           | 38.944                 | N    | 9.618      | 17.056      | 56.000             |

[ Average ]

| Frequency (MHz) | Average (dB $\mu$ V) | Line | Corr. (dB) | Margin (dB) | Limit (dB $\mu$ V) |
|-----------------|----------------------|------|------------|-------------|--------------------|
| 0.343           | 30.956               | N    | 9.570      | 18.186      | 49.142             |
| 0.411           | 29.787               | N    | 9.570      | 17.851      | 47.638             |
| 0.479           | 29.250               | N    | 9.570      | 17.115      | 46.365             |
| 0.546           | 27.011               | N    | 9.570      | 18.989      | 46.000             |
| 0.611           | 28.797               | N    | 9.570      | 17.203      | 46.000             |
| 0.612           | 28.826               | N    | 9.570      | 17.174      | 46.000             |
| 0.681           | 25.850               | N    | 9.570      | 20.150      | 46.000             |
| 3.111           | 26.800               | N    | 9.599      | 19.200      | 46.000             |
| 4.030           | 29.478               | N    | 9.611      | 16.522      | 46.000             |
| 4.737           | 31.327               | N    | 9.618      | 14.673      | 46.000             |

\* QP : Quasi-peak, AV: Average

\* Result = Level(QP or AV) + Trans. (LISN Insertion loss + Cable loss)

\* Margin = Limit - Level

■ Operating Mode : PC camera (1394)

## Test Information

EUT Name: SC-D965  
Serial Number:  
Test Description:  
Operating Conditions: PC CAM  
Operator Name:  
Comment: Only 1394 operation

## Hardware Setup: Voltage with 2-Line-LISN - [EMI conducted]

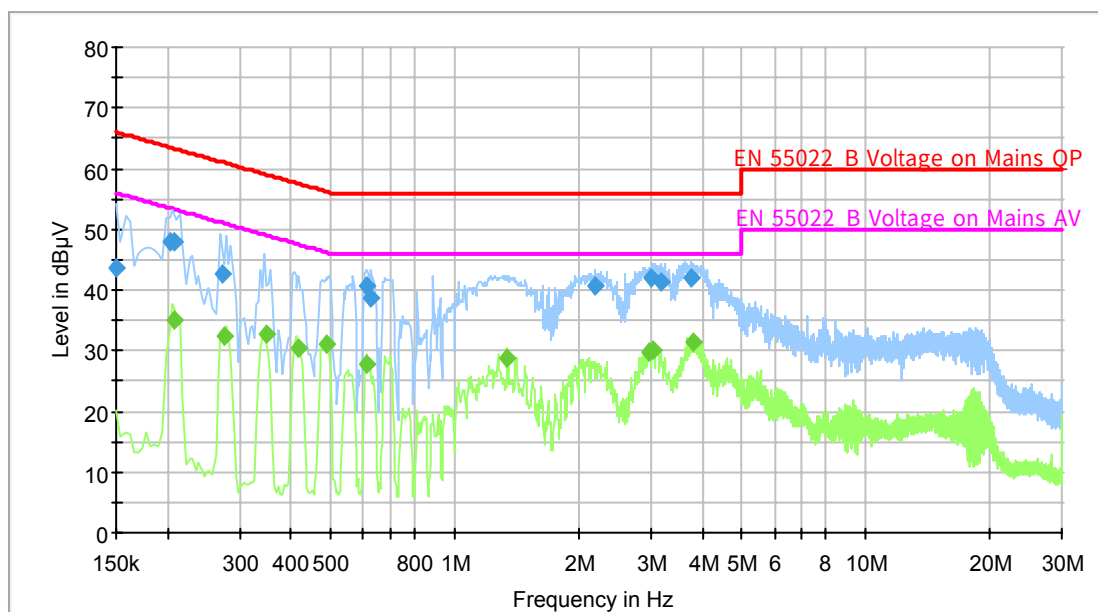
Subrange 1  
Frequency Range: 150kHz - 30MHz  
Receiver: ESCI 3  
Transducer: ENV216 / Receiver-2-Line-LISN ENV216

## Scan Setup: EN55022\_B\_2-Line-LISN fin [EMI conducted]

Hardware Setup: Voltage with 2-Line-LISN  
Level Unit: dB  $\mu$ V

| Subrange       | Detectors          | IF Bandwidth | Meas. Time | Receiver |
|----------------|--------------------|--------------|------------|----------|
| 150kHz - 30MHz | QuasiPeak; Average | 9kHz         | 5s         | ESCI 3   |

## [Graph and Data]



[ Quasi Peak ]

| Frequency (MHz) | QuasiPeak (dB $\mu$ V) | Line | Corr. (dB) | Margin (dB) | Limit (dB $\mu$ V) |
|-----------------|------------------------|------|------------|-------------|--------------------|
| 0.150           | 43.543                 | L1   | 9.566      | 22.457      | 66.000             |
| 0.203           | 48.047                 | L1   | 9.570      | 15.460      | 63.507             |
| 0.209           | 48.001                 | L1   | 9.570      | 15.263      | 63.265             |
| 0.271           | 42.565                 | L1   | 9.570      | 18.538      | 61.103             |
| 0.612           | 40.579                 | N    | 9.570      | 15.421      | 56.000             |
| 0.627           | 38.660                 | N    | 9.570      | 17.340      | 56.000             |
| 2.201           | 40.663                 | N    | 9.584      | 15.337      | 56.000             |
| 3.017           | 41.863                 | N    | 9.598      | 14.137      | 56.000             |
| 3.195           | 41.441                 | N    | 9.600      | 14.559      | 56.000             |
| 3.764           | 41.952                 | N    | 9.608      | 14.048      | 56.000             |

[ Average ]

| Frequency (MHz) | Average (dB $\mu$ V) | Line | Corr. (dB) | Margin (dB) | Limit (dB $\mu$ V) |
|-----------------|----------------------|------|------------|-------------|--------------------|
| 0.208           | 35.020               | N    | 9.570      | 18.285      | 53.305             |
| 0.276           | 32.468               | N    | 9.570      | 18.483      | 50.950             |
| 0.347           | 32.766               | N    | 9.570      | 16.280      | 49.046             |
| 0.415           | 30.500               | N    | 9.570      | 17.058      | 47.558             |
| 0.489           | 31.000               | N    | 9.570      | 15.193      | 46.193             |
| 0.610           | 27.764               | N    | 9.570      | 18.236      | 46.000             |
| 1.346           | 28.755               | N    | 9.574      | 17.245      | 46.000             |
| 2.982           | 29.870               | N    | 9.597      | 16.130      | 46.000             |
| 3.041           | 29.997               | N    | 9.598      | 16.003      | 46.000             |
| 3.824           | 31.296               | N    | 9.608      | 14.704      | 46.000             |

\* QP : Quasi-peak, AV: Average

\* Result = Level(QP or AV) + Trans. (LISN Insertion loss + Cable loss)

\* Margin = Limit - Level

\* PC camera is operated by only 1394 mode. (The operation at USB mode is blocked by software.)

### 3.2 Radiated emission

#### 3.2.1 Test information

|                   |                                                                                             |
|-------------------|---------------------------------------------------------------------------------------------|
| Test engineer     | Tae Young, Jang                                                                             |
| Test date         | March 17, 2006                                                                              |
| Climate condition | Ambient temperature : 22.3 °C, Relative humidity : 32 %<br>Atmospheric pressure : 101.2 kPa |
| Test place        | 10 m Semi-Anechoic Chamber #1                                                               |

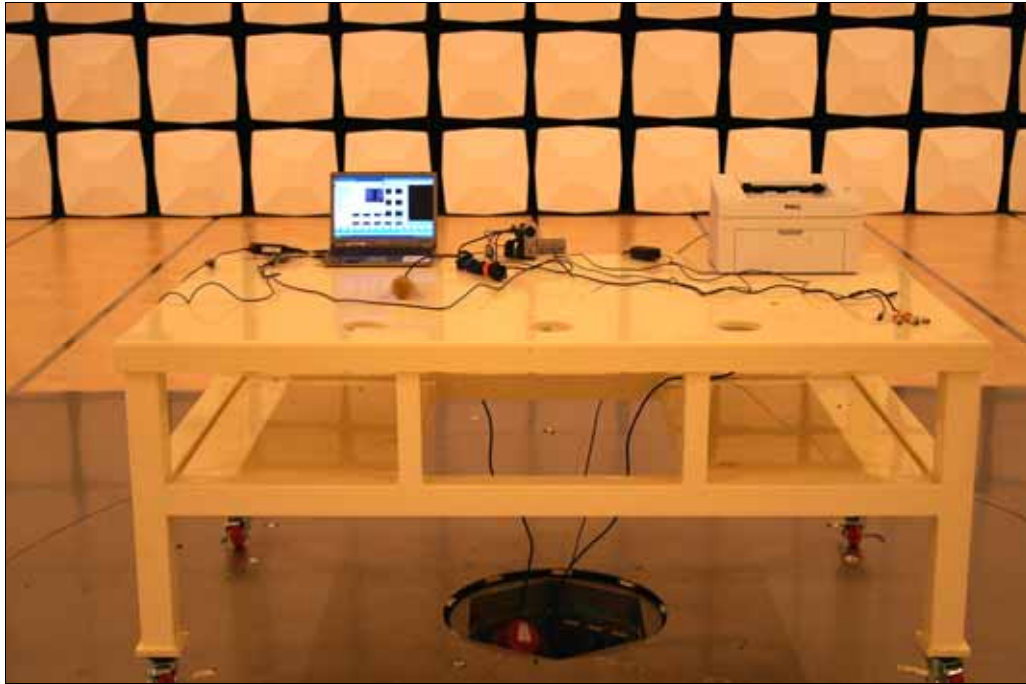
#### 3.3.2 Test equipment

| Equipment       | Model name | Manufacturer | Serial no. | Calibration |                 |
|-----------------|------------|--------------|------------|-------------|-----------------|
|                 |            |              |            | Date        | Interval(Month) |
| Bi-con Antenna  | CBL6141A   | SCHAFFNER    | 4268       | 2005-05-24  | 12              |
| Bi-con Antenna  | CBL6141A   | SCHAFFNER    | 4266       | 2005-05-24  | 12              |
| EMI Receiver    | ESI26      | R&S          | 100289     | 2005-04-11  | 12              |
| EMI Receiver    | ESI26      | R&S          | 100291     | 2005-04-12  | 12              |
| AMPLIFIER       | 310N       | SONOMA       | 251674     | 2006-03-08  | 12              |
| AMPLIFIER       | 310N       | SONOMA       | 251677     | 2006-03-08  | 12              |
| Ant Mast        | MA4000     | Inn-co       | -          | N/A         |                 |
| Ant Mast        | MA4000     | Inn-co       | -          | N/A         |                 |
| Mast Controller | CO2000     | Inn-co       | -          | N/A         |                 |
| RF Selector     | NS4900     | TOYO         | -          | N/A         |                 |

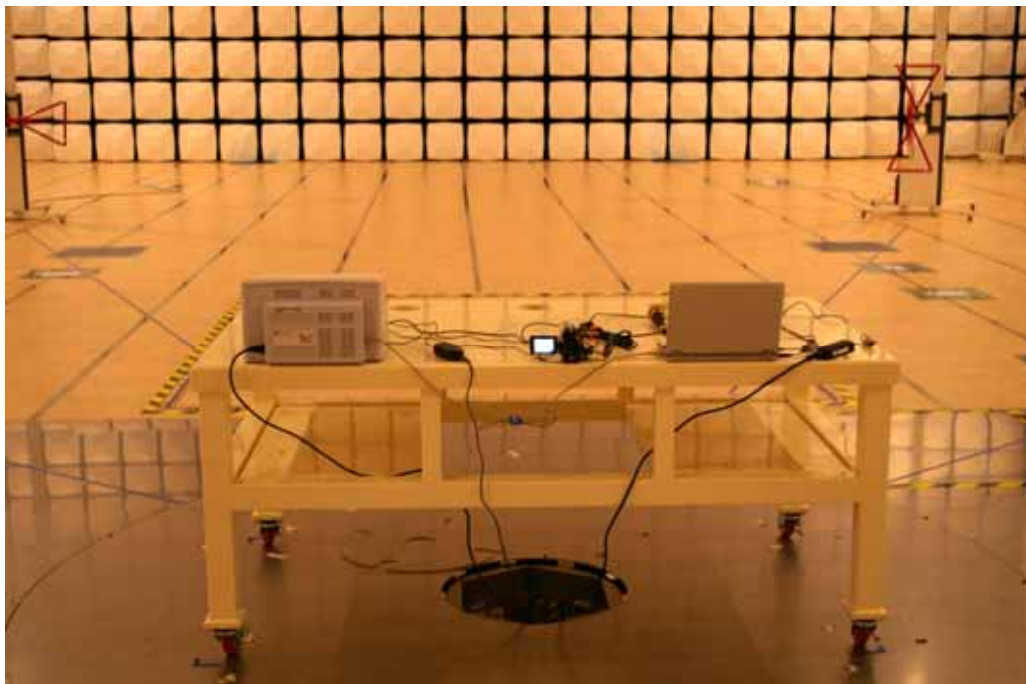
#### EUT Test Setup

The EUT was set up on a plastic table at least 0.8m from all metallic objects with the cables, to be tested, extended to pass through the absorbing clamp and along the length of the track.

The cables was terminated into the characteristic impedance of the port.



Front



Rear

|                            |                                                                                            |
|----------------------------|--------------------------------------------------------------------------------------------|
| <b>Measurement Results</b> | Complied<br>The measured emissions of the EUT have found to be below the specified limits. |
|----------------------------|--------------------------------------------------------------------------------------------|

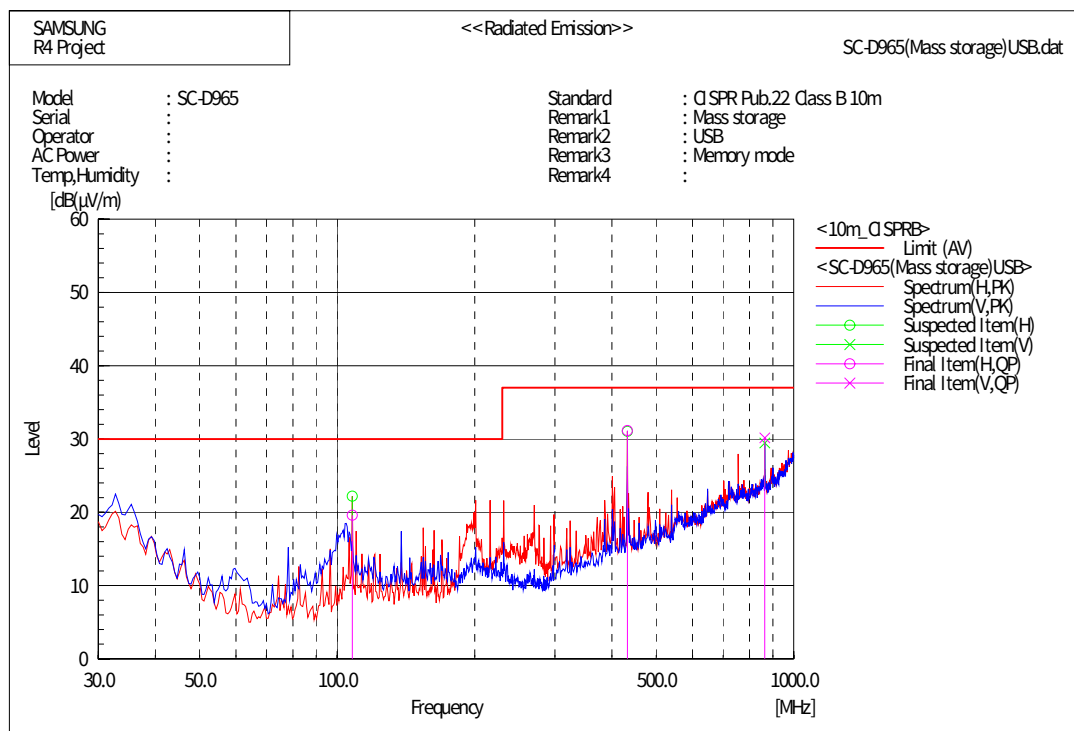
|                    |
|--------------------|
| <b>Uncertainty</b> |
|--------------------|

(Hor) 4.00 dB $\mu$ V/m, (Ver) 4.40 dB $\mu$ V/m (95 % C.L, k=2)

**Test Data (Local Oscillator)**

■ Operating Mode : Mass storage (USB)

**[Graph and Data]**



**Final Result**

--- Horizontal Polarization (QP)---

| No. | Frequency [MHz] | Reading [dB(μV)] | c.f [dB(1/m)] | Result [dB(μV/m)] | Limit [dB(μV/m)] | Margin [dB] | Remark |
|-----|-----------------|------------------|---------------|-------------------|------------------|-------------|--------|
| 1   | 107.994         | 38.7             | -19.1         | 19.6              | 30.0             | 10.4        |        |
| 2   | 432.011         | 43.2             | -12.0         | 31.2              | 37.0             | 5.8         |        |

--- Vertical Polarization (QP)---

| No. | Frequency [MHz] | Reading [dB(μV)] | c.f [dB(1/m)] | Result [dB(μV/m)] | Limit [dB(μV/m)] | Margin [dB] | Remark |
|-----|-----------------|------------------|---------------|-------------------|------------------|-------------|--------|
| 1   | 863.991         | 33.6             | -3.4          | 30.2              | 37.0             | 6.8         |        |



## 4. Appendix

### 4.1 EUT photography



Picture 1. EUT (Front)



Picture 2. EUT (Rear)



Picture 3. EUT (Leftside)



Picture 4. EUT (Leftside2)



Picture 5. EUT (Rightside)



Picture 6. EUT (Label)