



EMC

TEST REPORT

REPORT NO. : F87030603
MODEL NO. : SD5904CM, RD15M2, SD5904C
DATE OF TEST : April 2, 1998

PREPARED FOR: DELTA ELECTRONICS INC.

ADDRESS : NO. 31-1, SHIEN PAM ROAD,
KUEI SHAN INDUSTRIAL ZONE,
TAOYUAN HSIEN, TAIWAN, R.O.C.

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION



Accredited Laboratory

12F, NO.1, SEC.4, NAN-KING EAST RD.,
TAIPEI, TAIWAN, R.O.C.

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1.

CERTIFICATION

Issue Date: April 6, 1998

Product : COLOR MONITOR
 Trade Name : MITSUBISHI
 Model No. : SD5904CM, RD15M2, SD5904C
 Applicant : DELTA ELECTRONICS INC.
 Standard : FCC Part 15, Subpart B, Class B
 : ANSI C63.4-1992
 : CISPR 22:1993+A1+A2

We hereby certify that one sample of the designation has been tested in our facility on April 2, 1998. The test record, data evaluation and Equipment Under Test (EUT) configurations represent herein are true and accurate representation of the measurements of the sample's EMC characteristics under the conditions herein specified.

The test results show that the EUT as described in this report is in compliance with the Class B limits of conducted and radiated emission of applicable standards.

TESTED BY: Jackey Chang, DATE: 4/6/98
 (Jackey Chang)

CHECKED BY: Sharon Hsiung, DATE: 4/6/98
 (Sharon Hsiung)

APPROVED BY: Mike Su, DATE: 4/6/98
 (Mike Su)

ADVANCE DATA TECHNOLOGY CORPORATION



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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

| | | |
|-------------------|---|---------------------------|
| Product | : | COLOR MONITOR |
| Model No. | : | SD5904CM, RD15M2, SD5904C |
| Power Supply Type | : | Switching |
| Power Cord | : | Nonshielded (1.8 m) |
| Data Cable | : | Shielded (1.6 m) |
| Audio Cable | : | Shielded (1.5 m) |

Note: The EUT has three model names which are identical to each other in all aspects except for their outer appearances:

Model: SD5904CM
Model: RD15M2
Model: SD5904C

From the above model names, model: SD5904CM was selected as representative model for the test, and its data is recorded in this report.

The EUT is a 15" color monitor with resolution up to 1280x1024.

There is one ferrite core on the video cable outside the monitor.

For more detailed features description, please refer to ATTACHMENT 1 - TECHNICAL DESCRIPTION OF EUT and User's Manual.



2.2 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories are used to form representative test configuration during the tests.

| No. | Product | Brand | Model No. | FCC ID | I/O Cable |
|-----|---------------------|-----------------|----------------------|------------------|--|
| 1 | PERSONAL COMPUTER | HP | VL SERIES 4 5/100 | B94VECTRA500T | Nonshielded Power (1.8m) |
| 2 | KEYBOARD | HP | C3758A | CIGEO3633 | Shielded Signal (1.2m) |
| 3 | PRINTER | HP | 2225C+ | DSI6XU2225 | Shielded Signal (1.2m) Nonshielded Power (1.8m) |
| 4 | MODEM | DATATRON ICS | 1200CK | E2O5OV1200CK | Shielded Signal (1.2m) Nonshielded Power (1.8m) |
| 5 | MOUSE | HP | M-S34 | DZL211029 | Shielded Signal (1.8m) |
| 6 | VGA DISPLAY CARD | GORDIA | DSV3365 | LUT-DSV3365 | N/A |
| 7 | SOUND CARD | YA HSIN | AUDIO 1869 | FCC DoC approved | N/A |
| 8 | EARPHONE | GAMMA | LH115 | N/A | Nonshielded signal (1.4m) |

2.3 TEST METHODOLOGY AND CONFIGURATION

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4:1992. Radiated testing was performed at an antenna to EUT distance of 10 m on an open area test site. Please refer to the photos of test configuration in Item 5.



3. TEST INSTRUMENTS

3.1 TEST INSTRUMENTS (EMISSION)

RADIATED EMISSION MEASUREMENT

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|---------------------------------------|----------------------|--------------------|------------------|
| HP Spectrum Analyzer | 8594A | 3144A00308 | Sept. 1, 1998 |
| HP Preamplifier | 8447D | 2944A08119 | Aug. 2, 1998 |
| ROHDE & SCHWARZ TEST RECEIVER | ESVP | 893496/030 | July 17, 1998 |
| SCHWARZBECK Tunable Dipole Antenna | VHA 9103 UHA 9105 | E101051 E101055 | Nov. 28, 1998 |
| CHASE Bilog Antenna | CBL6112 | 2086 | Dec. 26, 1998 |
| EMCO Turn Table | 1060 | 1195 | N/A |
| EMCO Tower | 1051 | 1163 | N/A |
| Open Field Test Site | Site 2 | ADT-R02 | Sept. 26, 1998 |

Note: 1. The measurement uncertainty is less than +/- 3dB, which is calculated as per NAMA's document NIS81.

2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

CONDUCTED EMISSION MEASUREMENT

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|---|-----------|------------|------------------|
| ROHDE & SCHWARZ Test Receiver | ESHS30 | 828765/002 | July 31, 1998 |
| ROHDE & SCHWARZ Artificial Mains Network | ESH2-Z5 | 828075/003 | July 28, 1998 |
| EMCO-L.I.S.N. | 3825/2 | 90031627 | July 28, 1998 |
| Shielded Room | Site 5 | ADT-C05 | N/A |

Note: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per NAMA's document NIS81.

2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.



3.2 LIMITS OF CONDUCTED AND RADIATED EMISSION

LIMIT OF RADIATED EMISSION OF CISPR 22

| FREQUENCY (MHz) | Class A (at 10m) | Class B (at 10m) |
|--------------------|------------------|------------------|
| | dBuV/m | dBuV/m |
| 30 - 230 | 40 | 30 |
| 230 - 1000 | 47 | 37 |

LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

| FREQUENCY (MHz) | Class A (at 10m) | | Class B (at 3m) | |
|--------------------|------------------|--------|-----------------|--------|
| | uV/m | dBuV/m | uV/m | dBuV/m |
| Above 1000 | 300 | 49.5 | 500 | 54.0 |

- Note: (1) The lower limit shall apply at the transition frequencies.
 (2) Emission level (dBuV/m) = 20 log Emission level (uV/m).
 (3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

LIMIT OF CONDUCTED EMISSION OF CISPR 22

| FREQUENCY (MHz) | Class A (dBuV) | | Class B (dBuV) | |
|--------------------|----------------|---------|----------------|---------|
| | Quasi-peak | Average | Quasi-peak | Average |
| 0.15 - 0.5 | 79 | 66 | 66 - 56 | 56 - 46 |
| 0.50 - 5.0 | 73 | 60 | 56 | 46 |
| 5.0 - 30.0 | 73 | 60 | 60 | 50 |

- Note: (1) The lower limit shall apply at the transition frequencies.
 (2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz
 (3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.



4. TEST RESULTS (EMISSION)

4.1 RADIO DISTURBANCE

| | | |
|----------------------|---|---|
| Frequency Range | : | 0.15 - 30 MHz (Conducted Emission) 30 - 1000 MHz (Radiated Emission) |
| Input Voltage | : | 120 Vac, 60 Hz |
| Temperature | : | 21 °C |
| Humidity | : | 55 % |
| Atmospheric Pressure | : | 1060 mbar |

| TEST RESULT | Remarks |
|-------------|--|
| PASS | Minimum passing margin of conducted emission: -15.8 dB at 21.692 MHz |
| | Minimum passing margin of radiated emission: -3.1 dB at 44.65 MHz |

Note: The EUT was pretested under the following resolution & horizontal synchronization speed mode:

- * 1280x1024 mode (64 kHz),
- * 1024x768 mode (69 kHz),
- * 640x480 mode (31.5 kHz)

The worst emission levels were found under 1280x1024 mode (64 kHz) and therefore the test data of only this mode is recorded.

4.1.1 EUT OPERATION CONDITION

1. Turn on the power of all equipments.
2. PC runs a test program to enable all functions.
3. PC reads and writes messages from FDD and HDD.
4. PC sends "H" messages to monitor (EUT) and monitor displays "H" patterns on screen.
5. PC sends "H" messages to modem.
6. PC sends "H" messages to printer, and the printer prints them on paper.
7. PC sends audio messages to earphone.
8. Repeat steps 3-8.



4.2 TEST DATA OF CONDUCTED EMISSION

EUT: COLOR MONITOR

MODEL: SD5904CM

MODE: 1280x1024 (64 kHz)

6 dB Bandwidth: 10 kHz

TEST PERSONNEL:

Jackey Chang

| Freq. [MHz] | L Level | | N Level | | Limit | | Margin [dB (μ V)] | | | |
|----------------|-----------------|----|-----------------|----|-----------------|-------|------------------------|----|-------|----|
| | [dB (μ V)] | | [dB (μ V)] | | [dB (μ V)] | | L | | N | |
| | QP | AV | QP | AV | QP | AV | QP | AV | QP | AV |
| 0.192 | 45.70 | - | 44.70 | - | 63.93 | 53.93 | -18.2 | - | -19.2 | - |
| 0.450 | 39.40 | - | 38.20 | - | 56.87 | 46.87 | -17.5 | - | -18.7 | - |
| 0.771 | 29.00 | - | 28.90 | - | 56.00 | 46.00 | -27.0 | - | -27.1 | - |
| 5.844 | 26.60 | - | 29.40 | - | 60.00 | 50.00 | -33.4 | - | -30.6 | - |
| 17.150 | 41.30 | - | 40.40 | - | 60.00 | 50.00 | -18.7 | - | -19.6 | - |
| 21.692 | 44.20 | - | 44.00 | - | 60.00 | 50.00 | -15.8 | - | -16.0 | - |

- Remarks:
1. "*": Undetectable
 2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 4. The emission level of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value

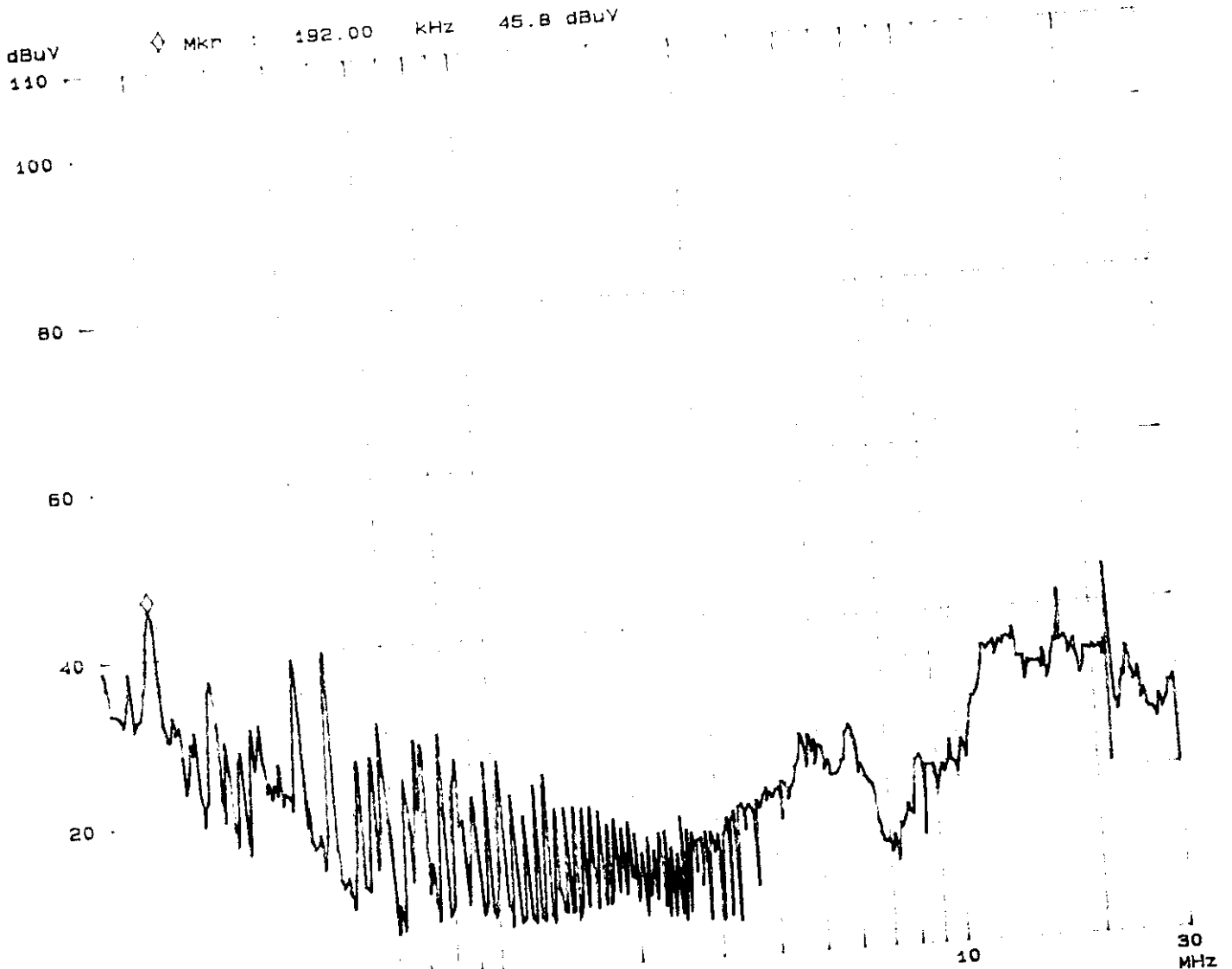
02. Apr 98 12:28

ADT CO. SITE 5
CISPR 22 CLASS B

Manuf: SD5904CM
Operator: JACKIEY
Test Spec: LISN : L
Comment: 1280X1024 64kHz

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Tested by Jackie Chang

| Fast Scan Settings (3 Ranges) | | | Receiver Settings | | | | | |
|-------------------------------|------|------|-------------------|----------|--------|-------|---------|-------|
| Start | Stop | Step | IF BW | Detector | M-Time | Atten | Preamp | OpRge |
| 150k | 450k | 3k | 10k | PK | 1ms | 10dB | BLN OFF | 60dB |
| 450k | 5M | 3k | 10k | PK | 1ms | 10dB | BLN OFF | 60dB |
| 5M | 30M | 3k | 10k | PK | 1ms | 10dB | BLN OFF | 60dB |



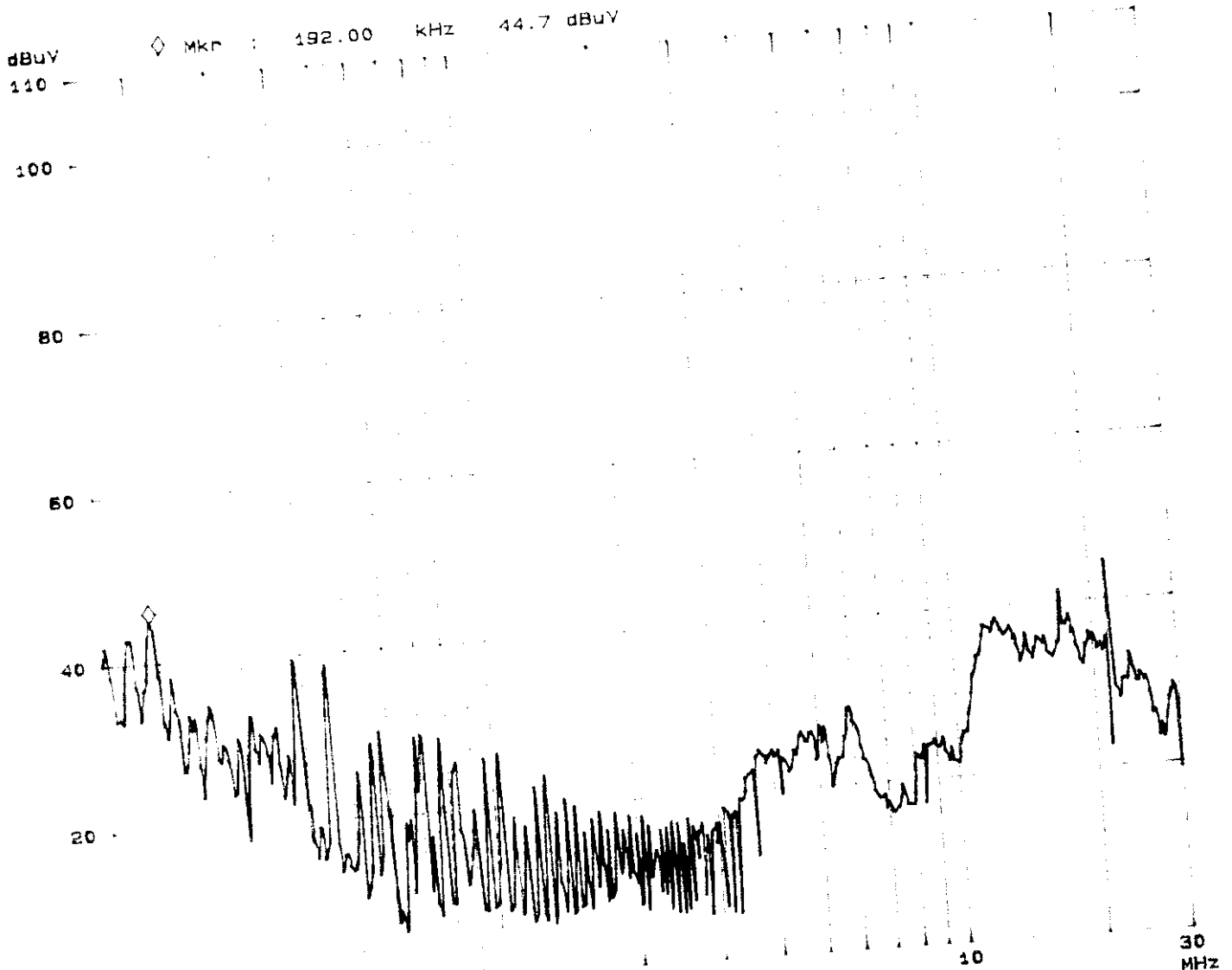
02. Apr 98 12:07

ADT CO. SITE 5
CISPR 22 CLASS B

Manuf: SD5904CM
Operator: JACKY
Test Spec: LISN: N
Comment: 1280X1024 64kHz

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Tested by *Jackey Chang*

| Fast Scan Settings (3 Ranges) | | | Receiver Settings | | | | | |
|-------------------------------|------|------|-------------------|----------|--------|-------|--------|-------|
| Start | Stop | Step | IF BW | Detector | M-Time | Atten | Preamp | OpRge |
| 150k | 450k | 3k | 10k | PK | 1ms | 10dB | OFF | 60dB |
| 450k | 5M | 3k | 10k | PK | 1ms | 10dB | OFF | 60dB |
| 5M | 30M | 3k | 10k | PK | 1ms | 10dB | OFF | 60dB |





4.3 TEST DATA OF RADIATED EMISSION

EUT: COLOR MONITOR

MODEL: SD5904CM

MODE: 1280x1024 (64 kHz)

ANTENNA: CHASE BILOG CBL6112

POLARITY: Horizontal

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

TEST PERSONNEL:

Jockey Chang

| Frequency (MHz) | Correction Factor (dB/m) | Reading Data (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|-----------------|--------------------------|---------------------|-------------------------|----------------|-------------|
| 55.58 | 9.7 | 15.2 | 24.9 | 30.0 | -5.1 |
| 75.77 | 8.4 | 15.4 | 23.8 | 30.0 | -6.2 |
| 86.67 | 9.9 | 10.7 | 20.6 | 30.0 | -9.4 |
| 108.32 | 13.8 | 6.1 | 19.9 | 30.0 | -10.1 |
| 162.43 | 12.4 | 7.5 | 19.9 | 30.0 | -10.1 |
| 216.64 | 14.1 | 6.3 | 20.4 | 30.0 | -9.6 |

- REMARKS :
1. Emission level (dBuV/m) = Correction Factor(dB/m) + Meter Reading (dBuV).
 2. Correction Factor(dB/m) = Ant. Factor(dB/m) + Cable loss(dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level - Limit value



TEST DATA OF RADIATED EMISSION

EUT: COLOR MONITOR

MODEL: SD5904CM

MODE: 1280x1024 (64 kHz)

ANTENNA: CHASE BILOG CBL6112

POLARITY: Vertical

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

TEST PERSONNEL:

Sucky Chong

| Frequency (MHz) | Correction Factor (dB/m) | Reading Data (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|-----------------|--------------------------|---------------------|-------------------------|----------------|-------------|
| 44.65 | 11.9 | 15.0 | 26.9 | 30.0 | -3.1 |
| 52.80 | 9.4 | 16.4 | 25.8 | 30.0 | -4.2 |
| 75.68 | 7.6 | 18.4 | 26.0 | 30.0 | -4.0 |
| 108.32 | 12.8 | 7.9 | 20.7 | 30.0 | -9.3 |
| 162.46 | 12.1 | 7.2 | 19.3 | 30.0 | -10.7 |
| 195.00 | 13.4 | 7.1 | 20.5 | 30.0 | -9.5 |

- REMARKS :
1. Emission level (dBuV/m) = Correction Factor(dB/m) + Meter Reading (dBuV).
 2. Correction Factor(dB/m) = Ant. Factor(dB/m)+Cable loss(dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level - Limit value



6. ATTACHMENT I-TECHNICAL DESCRIPTION OF EUT

SPECIFICATIONS:

| | |
|-------------------------|---|
| * CRT size | 15" (13.8" diagonal viewable image) Shadow mask |
| * Gun | In-Line, Mini-neck |
| * Deflection angle | 90 degree |
| * Phosphors | Red, Green, Blue (medium short persistence) |
| * Dot Pitch | 0.28mm |
| * Face Plate | Anti-Reflective and Anti-static coating |
| * Transmission | Approx. 57% |
| * Input Signal | Video: 0.7 Vp-p analog RGB Sync.: separated H,V Sync. Or composite sync. |
| * Interface | Input Connector: D-Sub 15P Input Impedance: 75 ohm (video) |
| * Scanning Frequency | Horizontal: 30-70 kHz Vertical: 50-100 Hz |
| * Resolution | 1280x1024 (Max.) |
| * Video Bandwidth | 85 MHz |
| * Display Area | 270mm x 200mm (typ.) |
| * Power Source | AC100-120V/220-240V+/-10% 50/60 Hz |
| * Operating Environment | Temp.: 0-35 °C Humidity: 10-80% RH (without condensation) |
| * Cabinet | (W) 365mm x (H) 371mm x (D) 397.5mm |
| * Weight | 14.5 kg. |