SKT **SK TECH CO., LTD.** *Page 1 of 1*

Certificate of Compliance

Test Report No.:	**SKTFCE-030506-055**		
NVLAP CODE :	**200220-0**		
Applicant:	**HITRON SYSTEMS INC.**		
Applicant Address:	109-19, Majeon-ri, Samjuk-Myeon, Ansung-City, Kyungki-Do, Korea		
Product:	**LCD MONITOR**		
FCC ID:	**LLIHTM150C**	**Model No.:**	**HTM150C, HTM150C25LN**
Buyer M/N :	**See page 3**		
Receipt No.:	SKTEU03-0230	**Date of receipt:**	Apr. 23, 2003
Date of Issue:	May 06, 2003		
Testing location:	**SK TECH CO., LTD.** 820-2, Wolmoon-Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea		
Test Standards:	**ANSI C63.4 / 2001**		
Rule Parts:	**FCC part 15 Subpart B**		

※ This device has shown compliance with the conducted emissions limits in 15.107, 15.207 or 18.307 adopted under FCC 02-157(ET Docket 98-80). The device may be marketed after July 11, 2005, and is not affected by the 15.37(j) or 18.123 transition provisions.

Equipment Class :	**Class B Digital Device Peripheral**
Test Result:	The above mentioned product has been tested and passed.

Prepared by: *Y.H.Kang*	**Tested by**:*Y.B.Kim/Engineer*	**Approved by**: *C.H.Jung/Manager & Chief Engineer*
Signature *Date*	*Signature* *Date*	*Signature* *Date*

Other Aspects :	
Abbreviations :	· **OK, Pass = passed** · **Fail = failed** · **N/A = not applicable**

☞
- **This test report is not permitted to copy partly without our permission.**
- **This test result is dependent on only equipment to be used.**
- **This test result is based on a single evaluation of one sample of the above mentioned.**
- **This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S Government.**
- **We certify that this test report has been based on the measurement standards that is traceable to the national or International standards.**

NVLAP®

NVLAP Lab. Code: 200220-0

》》 Contents 《《

》 List of Tables

》 List of Figures

BUYER MODEL NO.

AD9615V

NE-LCD15

CPT-LCD15-VGA

AMC15LCD

1. General

This equipment has been shown to be capable of compliance with the applicable technical standards and was tested in accordance with the measurement procedures as indicated in this report.

We attest to the accuracy of data. All measurements reported herein were performed by SK Tech Co., Ltd. and were made under Chief Engineer' s supervision.
We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. Test Site

SK TECH Co., Ltd.

2.1 Location

820-2, Wolmoon Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea

The test site is in compliance with ISO/IEC 17025 for general requirements for the competence of testing and calibration laboratories.
This laboratory is accredited by NVLAP for NVLAP Lab. Code : 200220-0
and DATech for DAR-Registration No.:DAT-P-076/97-01

2.2 List of Test and Measurement Instruments

Table 1 : List of Test and Measurement Equipment

■Conducted Disturbance

Kind of Equipment	Type	S/N	Calibrated until
EMI Receiver	ESHS10	862970/019	10.2003
Artificial Mains Network	ESH2-Z5	834549/011	10.2003
EMI Receiver	ESHS10	835871/002	10.2003
Artificial Mains Network	ESH3-Z5	836679/018	10.2003

■Radiated Disturbance

Kind of Equipment	Type	S/N	Calibrated until
EMI Receiver	ESVS 10	825120/013	10.2003
EMI Receiver	ESVS 10	834468/008	10.2003
Spectrum Analyzer	R3361A	11730187	10.2003
Amplifier	8447F	3113A05153	10.2003
Log Periodic Antenna	UHALP9107	1819	10.2003
Biconical Antenna	BBA9106	91031626	10.2003
Open Site Cable	N/A	N/A	N/A
Antenna Turntable Driver	5907	N/A	N/A
Antenna Turntable controller	5906	N/A	N/A
Amp & Receiver connection cable	N/A	N/A	N/A
Amp & Spectrum connection cable	N/A	N/A	N/A
50Ω Switcher	MP59B	6100214538	N/A

2.3 Test Date

Date of Application : Apr. 23, 2003

Date of Test : May 06, 2003

2.4 Test Environment

See each test item’ s description.

3. Description of the tested samples

The EUT is LCD Monitor.

3.1 Rating and Physical Characteristics

General

Power Requirement	DC 12V 3.0A
Power Consumption	30 Watts
AC Adaptor Connector	IEC-320 Male, 100-240Vac
User Controls	Bright, Contrast, Tilt, Color, Sharpness, etc
OSD Language	English / France / German / Italian / Spanish / Polish
Dimensions	349.2mm(W) x 285.7mm(H) x 44.5mm(D)
Weight	2.7Kg
Operating temperature	0 to 40 degree
Storage temperature	0 to 50 degree
Audio input connector	RCA x 2
Audio amplifier	0.5W x 2

LCD

LCD Panel	15.0 inches TFT LCD Panel
Pixel format	1024(H) x 768(V), RGB vertical stripe
Pixel pitch	0.297mm x 0.297mm
Color depths	6 Bit / 262,144 Colors
Contrast ratio	300 : 1 (typical)
Viewing angles(L/R/U/D)	70/70/55/60 (typical)
Light source / Lifetime	4CCFL / 35,000Hrs(typical)
Response time (tr/td)	5/20ms

Video

Video mode	NTSC/PAL (Auto selection)
Scanning method	Digital progressive scan (Frame/Motion mode)
Video input signal	Composite : 0.7Vp-p, 75 ohm S-video : 0.7Vp-p (Luminance), 0.3Vp-p (Chrominance), 75 ohm
Video connector	Composite : BNC x 2 S-video : 4 pin Mini-din x 2
Termination	75 ohm, Auto termination
Resolution	More than 500 lines

PC

Input signal	Analog RGB(0.714Vp-p, 75 ohm), H&V Sync(TTL)
Input connector	15 pin D-sub
Input resolution	VGA 640 x 480 60 to 75Hz SVGA 800 x 600 56 to 75Hz XGA 1024 x 768 60 to 75Hz
Plug & Play	DDC 2B

3.2 Submitted Documents

N/A

4. Measurement Conditions

Operating of EUT voltage is 12V DC supplied by the adaptor which is structural element for EUT.
(Adaptor Input Voltage : AC 120V, 60Hz)

4.1 Modes of Operation

The EUT was in the following operation mode during all testing;
EUT is connected with PC by video interface cable.
Tested in mode of displaying " H" on the screen(EUT-LCD Monitor).
Tested in mode of displaying picture on the screen(CCTV Monitor).

4.2 List of Peripherals

Description	Manufacturer	Model Name	Serial No.	FCC ID
Color LCD Monitor (EUT)	Hitron Systems	HTM150C	M3040001	LLIHTM150C
Adapter (for EUT)	SERONICS	SAD5012SE	CB2200041	N/A
Personal Computer	LG-IBM	W8S	203KI00552	N/A
Color Video Monitor	Hitron Systems	CVM0954	M3010002	N/A
Keyboard	LG-IBM	LKB-0107	90604277	N/A
Mouse(PS/2)	Logitech	M-S48a	HCA13802892AW	JNZ201213
Mouse(RS232)	Sejin	N/A	N/A	N/A
CCD Color Camera	Hitron Systems	HOC4P05N2E	M0120003	N/A
Adapter (for Camera)	SIGMA Telecom	STA-24050VA	N/A	N/A
Printer	H.P	2225C	3032S00310	DSI6XU2225
Adapter (for Printer)	Shin Young Elec.	SY-1010K	N/A	N/A

4.3 Type of Used Cables

Description	Length	Type of shield	Manufacturer	Remark
AC/DC Adapter cable	1.2m	Non-shield	None	For EUT
BNC cable (x2)	1.6m	Shield	None	For EUT
A/V cable (x2)	1.2m	Shield	None	For EUT
S-Video cable (x2)	1.2m	Non-shield	None	For EUT
AC/DC Adapter cable	1.2m	Non-shield	None	For Camera
PC power cable	1.2m	Non-shield	None	
CCD Monitor power cable	1.8m	Non-shield	None	
Keyboard interface cable	1.5m	Non-shield	None	
Mouse(PS2) interface	1.5m	Non-shield	None	
Mouse(RS232) interface	1.5m	Non-shield	None	
VGA cable	1.8m	Shield	None	For EUT
AC/DC Adapter cable	1.2m	Non-Shield	None	For Printer
Printer interface	1.6m	Non-Shield	None	

4.4 Test Setup

The test setup photographs showed the external supply connections and interfaces.

4.5 Uncertainty

1) Radiated disturbance

⊙ **Horizontally polarized radiated disturbances from 30MHz to 1000MHz at a distance of 10m**

Input quantity	Uncertainty of Xi		U(Xi) dB	Ci	Ciu(xi)	**CISPR 16-4**
	dB	Probability distribution function				
1) Receiver reading	±0.1	K =1	0.1	1	**0.1**	0.10
2) Attenuation: antenna-receiver	±0.18	K=2	0.09	1	**0.09**	0.05
3) Antenna factor	±1.5	K=2	0.75	1	**0.75**	1.00
RECEIVER CORRECTIONS:						
4) Sine wave voltage	±0.56	K=2	0.28	1	**0.50**	0.50
5) Pulse amplitude response	±1.5	Rectangular (√3)	0.87	1	**0.87**	0.87
6) Pulse repetition rate response	±1.5	Rectangular (√3)	0.87	1	**0.87**	0.87
7) Noise floor proximity	±0.5	K=2	0.25	1	**0.25**	0.25
8) AF frequency interpolation	±0.3	Rectangular (√3)	0.17	1	**0.17**	0.17
9) Balance	±0.3	Rectangular (√3)	0.17	1	**0.17**	0.53
10) AF height deviations	±0.5	Rectangular (√3)	0.29	1	**0.29**	0.29
11) Phase center location	±0.3	Rectangular (√3)	0.17	1	**0.17**	0.17
12) Directive difference	+1.0	Rectangular (√3)	0.29	1	**0.29**	0.29
13) Cross polarization	±0.9	Rectangular (√3)	0.52	1	**0.52**	0.52
14) Site corrections	±2.6	Rectangular (√3)	1.5	1	**1.5**	1.63
15) Mismatch (ant-receiver)	±1.06	U-shaped (√2)	0.75	1	**0.75**	0.67

Combined Uncertainty

$$Uc(xi) = \sqrt{(1)^2+(2)^2+(3)^2+(4)^2+(5)^2+(6)^2+(7)^2+(8)^2+(9)^2+(10)^2+(11)^2+(12)^2+(13)^2+(14)^2+(15)^2} = 2.37$$

Expanded Uncertainty

U= k*Uc(xi) = 2 * 2.37= 4.74dB

(The coverage factor k =2 yields approximately a 95% level of confidence)

⊙ **Vertically polarized radiated disturbances from 30MHz to 1000MHz at a distance of 10m**

Input quantity	Uncertainty of Xi		U(Xi) dB	Ci	Ciu(xi)	**CISPR 16-4**
	dB	Probability distribution function				
1) Receiver reading	±0.1	K =1	0.1	1	**0.1**	0.10
2) Attenuation: antenna-receiver	±0.18	K=2	0.09	1	**0.09**	0.05
3) Antenna factor	±1.5	K=2	0.75	1	**0.75**	1.00
RECEIVER CORRECTIONS:						
4) Sine wave voltage	±0.56	K=2	0.28	1	**0.50**	0.50
5) Pulse amplitude response	±1.5	Rectangular (√3)	0.87	1	**0.87**	0.87
6) Pulse repetition rate response	±1.5	Rectangular (√3)	0.87	1	**0.87**	0.87
7) Noise floor proximity	±0.5	K=2	0.25	1	**0.25**	0.25
8) AF frequency interpolation	±0.3	Rectangular (√3)	0.17	1	**0.17**	0.17
9) Balance	±0.9	Rectangular (√3)	0.52	1	**0.52**	0.52
10)AF height deviations	±0.3	Rectangular (√3)	0.17	1	**0.17**	0.17
11) phase center location	±0.3	Rectangular (√3)	0.17	1	**0.17**	0.17
12) directive difference	+1.0	Rectangular (√3)	0.29	1	**0.29**	0.29
13)cross polarization	±0.9	Rectangular (√3)	0.52	1	**0.52**	0.52
14) site corrections	±2.6	Rectangular (√3)	1.5	1	**1.5**	1.63
15) Mismatch (ant-receiver)	±1.06	U-shaped (√2)	0.75	1	**0.75**	0.67

Combined Uncertainty

Uc(xi)= √ $(1)^2+(2)^2+(3)^2+(4)^2+(5)^2+(6)^2+(7)^2+(8)^2+(9)^2+(10)^2+(11)^2+(12)^2+(13)^2+(14)^2+(15)^2$ = **2.43**

Expanded Uncertainty

U= k*Uc(xi) = 2 * 2.43 = 4.86dB

(The coverage factor k =2 yields approximately a 95% level of confidence)

2) Conducted disturbance

⊙ **Conducted disturbance from 150KHz to 30MHz using a 50W/50uH AMN**

input quantity	Uncertainty of Xi		U(Xi) dB	Ci	Ciu(xi)	**CISPR 16-4**
	dB	Probability distribution function				
1) Receiver Readeing	±0.1	K =1	0.1	1	**0.1**	0.10
2) Attenuation:AMN-receiver	±0.36	Triangular (√6)	0.15	1	**0.15**	0.05
RECEIVER CORRECTIONS:						
3) Sine wave voltage	±0.5	K=2	0.25	1	**0.25**	0.50
4) Pulse amplitude response	±1.5	Rectangular (√3)	0.87	1	**0.87**	0.87
5) Pulse repetition rate response	±1.5	Rectangular (√3)	0.87	1	**0.87**	0.87
6) AMN voltage division factor	±0.07	K=2	0.04	1	**0.04**	0.1
7) Mismatch : AMN-receiver	±0.55	U-shaped (√2)	0.39	1	**0.39**	0.53
8) AMN impedance	±1.52	Triangular (√6)	0.62	1	**0.62**	1.08

- 1)~8) For numbered comments, refer to following articles

Combined Uncertainty

Uc(xi)= $\sqrt{(1)^2+(2)^2+(3)^2+(4)^2+(5)^2+(6)^2+(7)^2+(8)^2}$ = **1.47**

Expanded uncertainty

U= k*Uc(xi) = 2 * 1.47 = 2.94dB

The coverage factor k =2 yields approximately a 95% level of confidence

⊙ **Refer**

1) receiver' s resolution capacity

2) refer to the sub clause 11. of a calibration report

3) quoted from CISPR 16-4

4) refer to a calibration report

5) refer to CISPR 16-4 article 5. 7)

6) refer to a calibration report and a measured AMN impedance data

5. EMISSION Test

5.1 Conducted Emissions

Result: **Pass**

The line-conducted facility is located inside a 2.0M x 3.6M x 7.2M shielded enclosure. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 604-05. A 1m x 1.5m wooden table 80cm. high is placed 40cm. away from the vertical wall and 1.5m away from the side wall of the shielded room. ROHDE & SCHWARZ Model ESH3-Z5 (10kHz-30MHz) 50ohm/50 uH Line-Impedance Stabilization Networks(LISNs) are bonded to the shielded room. The EUT is powered from the ROHDE & SCHWARZ LISN and the support equipment is powered from the ROHDE & SCHWARZ LISN. Power to the LISNs are filtered by a high-current high-insertion loss Lindgren enclosures power line filters (100dB 14kHz-10GHz). The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure.

All electrical cables are shielded by braided tinned copper zipper tubing with inner diameter of 1/2". If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the ROHDE & SCHWARZ LISN. All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1-meter length.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT. The spectrum was scanned from 450kHz to 30MHz with 100msec. sweep time. The frequency producing the maximum level was reexamined using EMI/field Intensity Meter (ESHS 10) and Quasi-Peak adapter. The detector function was set to CISPR quasi-peak mode. The bandwidth of the receiver was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission. Each emission was maximized by: switching power lines; varying the mode of operation or resolution; clock or data exchange speed; if applicable; whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in photograph of conducted test. Each EME reported was calibrated using self-calibrating mode.

Figure 1 : Spectral Diagram, LINE - PE

24 Apr 2003 11:19

CONDUCTED DISTURBANCE

EUT: HTM150C
Manuf:
Op Cond:
Operator:
Test Spec:
Comment: LINE-PE

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	10kHz	10kHz	PK	100msec	Auto	OFF	60dB

Final Measurement: Detector: X QP
Meas Time: 1sec
Peaks: 8
Acc Margin: 35 dB

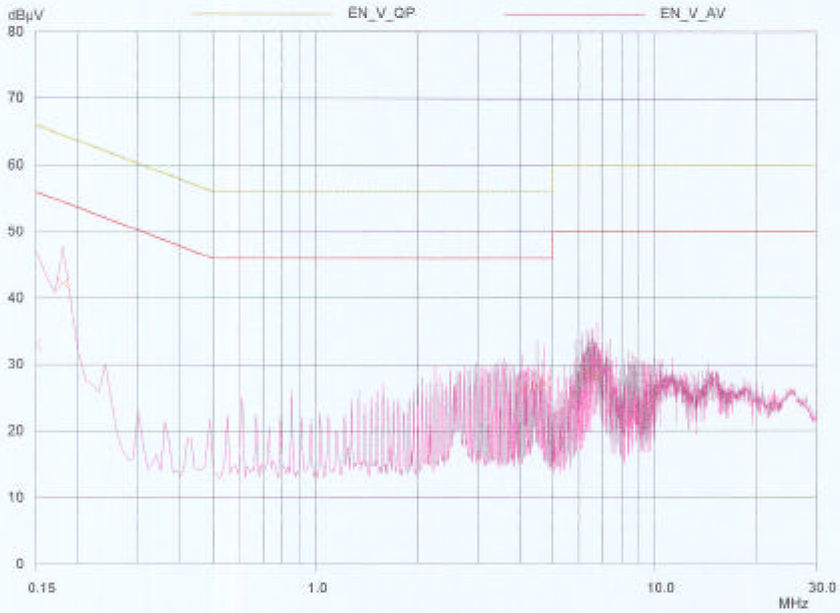

Figure 2 : Spectral Diagram, NEUTRAL – PE

24 Apr 2003 11:28

CONDUCTED DISTURBANCE

EUT:	HTM150C
Manuf:	
Op Cond:	
Operator:	
Test Spec:	
Comment:	NEUTRAL-PE

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	10kHz	10kHz	PK	100msec	Auto	OFF	60dB

Final Measurement:

Detector:	X QP
Meas Time:	1sec
Peaks:	8
Acc Margin:	35 dB

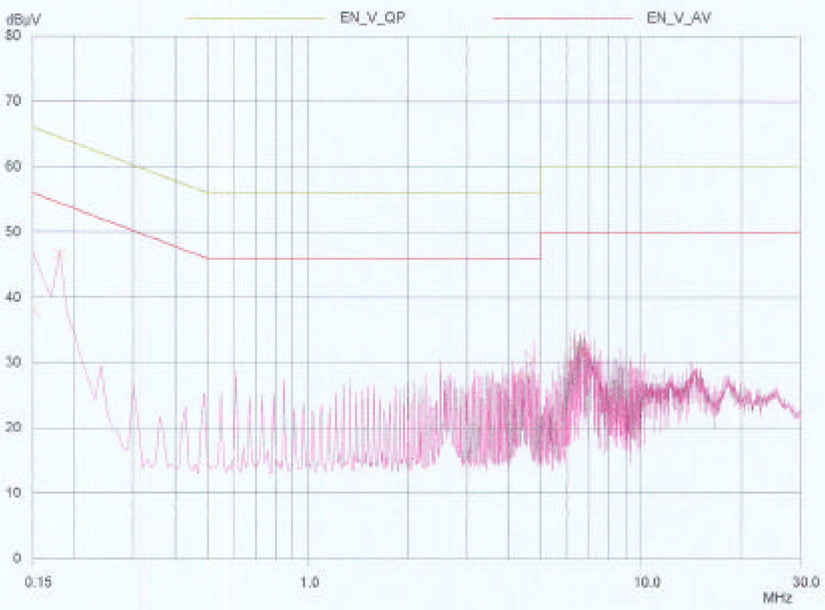

Table 2: Test Data, Conducted Emissions

▶ **LINE-PE**

Frequency (MHz)	Reading (dBμV)	C/F (dB)	CL (dB)	Limit (dBμV)	Margin (dB)
0.150	33.00	0.09	0.0	66.00	32.91
0.180	42.25	0.08	0.1	64.49	22.06
4.080	26.19	0.23	0.4	56.00	29.18
4.500	26.92	0.23	0.4	56.00	28.45
4.750	27.23	0.23	0.4	56.00	28.14
6.330	28.95	0.26	0.5	60.00	30.29
6.510	28.47	0.26	0.5	60.00	30.77
6.750	28.06	0.26	0.5	60.00	31.18

▶ **NEUTRAL-PE**

Frequency (MHz)	Reading (dBμV)	C/F (dB)	CL (dB)	Limit (dBμV)	Margin (dB)
0.150	38.08	0.13	0.0	66.00	27.79
0.180	46.55	0.13	0.1	64.49	17.71
4.500	28.06	0.24	0.4	56.00	27.30
4.750	30.53	0.24	0.4	56.00	24.83
6.090	30.13	0.30	0.5	60.00	29.07
6.340	32.92	0.30	0.5	60.00	26.28
6.580	31.91	0.30	0.5	60.00	27.29
6.760	31.30	0.30	0.5	60.00	27.90

NOTES:

1. All modes of operation were investigated and the worst-case emission are reported.
2. All other emissions are non-significant.
3. All readings are calibrated by self-mode in receiver.
4. Measurements using CISPR quasi-peak mode.
5. C/F = Correction Factor
6. C/L = Cable Loss

♠**Margin Calculation**

(6)Margin = (5)Limit - (4)Actual

[(4)Actual = (1)Reading + (2)C/F + (3)C/L]

5.2 Radiated Emissions

Result : **Pass**

Preliminary measurements were made indoors at 1 meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found.
The spectrum was scanned from 30 to 300 MHz using biconical antenna and from 300 to 1000 MHz using log-periodic antenna. Above 1GHz, linearly polarized double ridge horn antennas were used.

Final measurements were made outdoors at 3-meter test range using SCHWARZBECK dipole antennas. The test equipment was placed on a wooden table situated on a 4x4 meter area adjacent to the measurement area. Turntable was to protect from weather in the dome that made with FRP.
Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using EMI/Field Intensity Meter(ESVS 10) and Quasi-Peak Adapter. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 100kHz or 1MHz depending on the frequency or type of signal.

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non-metallic 1 x 1.5 meter table.
The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission.
Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed, and/or support equipment, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission.
Photographs of the worst-case emission can be seen in photograph of radiated emission test.
Each EME reported was calibrated using self-calibrating mode.

Table 3 : Test Data, Radiated Emissions

Frequency (MHz)	Pol.	Height [m]	Angle [°]	(1) Reading (dBμV)	(2) AFCL (dB/m)	(3) Actual (dBμV/m)	(4) Limit (dBμV/m)	(5) Margin (dB)
135.12	V	1.2	125	22.2	16.1	38.3	43.5	5.2
197.34	V	3.5	205	20.5	18.6	39.1	43.5	4.4
966.32	H	4.0	301	16.1	32.3	48.4	54.0	5.6
579.74	H	2.5	225	14.4	25.6	40.0	46.0	6.0
323.11	V	1.2	168	15.9	19.8	35.7	46.0	10.3
394.24	H	3.8	59	14.3	22.0	36.3	46.0	9.7

Table. Radiated Measurements at 3-meters

NOTES:

1. All modes of operation were investigated and the worst-case emission are reported.
2. All other emission are non-significant.
3. All readings are calibrated by self-mode in receiver.
4. Measurements using CISPR quasi-peak mode.
5. AFCL = Antenna factor and cable loss
6. H = Horizontal, V = Vertical Polarization

♠Margin Calculation

(5)Margin = (4)Limit - (3)Actual

[(3)Actual = (1)Reading + (2)AFCL]