



UL Korea, Ltd

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Project: 09CA34626
File: TC8312
Report 09CA34626-FCC
Date: August 27, 2009
Model: VP4726

FCC Test Report

FCC Certification Part 15 Subpart B Class B

For

**D&T Inc.
59-9 JANG-DONG YUSEONG-GU DAEJEON 305-343 KOREA**

UL Korea Ltd.

33rdFl. Gangnam finance Center, 737 Yeoksam-Dong, Kangnam-Gu, Seoul, 135-984, Korea
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A not-for-profit organization dedicated
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Project Number: 09CA34626 File Number TC8312 Test Report No: 09CA34626-FCC
Model Number: VP 4726 Date of Issue: August 31, 2009
Client Name: D&T Inc.

Test Report Details

Tests Performed By: UL Korea Ltd.
33rd FL. GFC Bldg. 737 Yeoksam-dong,
Kangnam-ku, Seoul, 135-984, Korea

Test Site: CHUNGBUK TECHNOPARK
FCC Registration No. : 553281
685-3 Yangcheong-ri, Ochang-eub,Cheongwon-kun,Chungbuk-
province,Republic of Korea

The test facility was deemed to have the environment and
capabilities necessary to perform the tests included in the test
package.

Applicant: D&T Inc.
59-9 JANG-DONG YUSEONG-GU DAEJEON 305-343 KOREA

Manufacturer: D&T Inc.
59-9 JANG-DONG YUSEONG-GU DAEJEON 305-343 KOREA

Applicant Contact: MR. Won-Woo Lee

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Product Type: Medical Monitor

Model Number: VP4726

Model Number multiple listing: VP 4726F

Product standards: 47CFR PART 15.107(A) / 47CFR PART 15.109(G) Class B

Test Report Number: 09CA26433-FCC

Sample Serial Number: N/A

Sample Receive Date: August 20, 2009

Testing Start Date: August 20, 2009

Date Testing Complete: August 24, 2009

Test Report Date: August 24, 2009

Overall Results:

Pass

UL Korea as an affiliate of Underwriters Laboratories Inc. EMC report apply only to the specific test samples and test results submitted for UL's review. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. UL Korea Ltd. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from UL Korea Ltd. issued reports. This report shall not be used to claim, constitute or imply product certification, approval, or any agency of the National Authorities. This report may contain test results that are not covered by the NVLAP or KOLAS accreditation.

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SUMMARY OF TEST RESULTS:

The following tests were performed on a sample submitted for evaluation of compliance with 47CFR PART 15.107(A) / 47CFR PART 15.109(G) Class B

Test #	Test Name Test Requirement/Specification	Compliant	Not Compliant	See Remark
1	AC Power line Conducted Emission Test	X	-	-
2	Radiated Emission Test	X	-	-

Conclusion:

The tests listed in the Summary of Testing section of this report have been performed as a witness testing and the results recorded by UL Korea Ltd. in accordance with the procedures stated in each test requirement and specification. The Applicant as being applicable to the Equipment Under Test determined the test list. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.

The equipment under test has

- Met the technical requirements
- Not met the technical requirements



Tested by
Sung Hoon, Baek, Associate Project Engineer
Conformity Assessment Services – 3014ASEO
UL Korea Ltd.
August 31, 2009



Reviewed by
Jeawoon, Choi, Senior Project Engineer
Conformity Assessment Services – 3014ASEO
UL Korea Ltd.
September 1, 2009

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1. GENERAL PRODUCT DESCRIPTION

1.1 Report Revision history

Revision Date	Description	Remarks	Revision reviewed By
August 31, 2009	1. CSC BOARD Add (Manufacturer: D&T, Model: LB502 CSC BOARD). 2. CSC BOARD Function: Adjust the color of panel.	Original Report: 08CA62337	

1.2 Equipment Description

Description:	
The VP4726 (VP 4726F) is intended for use by general surgeons, gynecologists, urologists, thoracic, orthopedic, ENT, and plastic surgeons adequately trained in these surgical procedures.	

1.3 Details of Test Equipment (EUT)

Equipment Configuration:				
No.	Product Type	Manufacturer	Model	Comments
1	Medical monitor	D&T Inc.	VP4726	-
2	AC/DC Adapter of medical monitor	Bridgepower	JMW1150KA2400F09	-
3	DC Extension Cable	ConMed Linvatec	900-0034-00	75ft plenum cable
4	DVI cable	-	-	1 EA
5	VGA HDDB15 cable	-	-	1 EA
6	Hospital-grade AC power cord	-	-	1 EA
7	BNC cable	-	-	1 EA
8	S-Video cable	-	-	1 EA

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1.4 Equipment Specification

Specification	
Display	
LCD Display Panel	25.54 inches, (a-Si TFT Active matrix LCD)
Synchronization	2.5 - 5.0 Vpp separated sync
Response Time	<25ms Typ
View Angle	+/-89° (L/R) x +/89° (U/D)
Display Colors	16 million colors
Native Resolution	1920 dots x 1200 dots
Input Signal	1 x DVI 1 x Optical DVI 1 x VGA 1 x HD/SD-SDI 1 x C-Video/SOG 1 x S-Video 1 x Component (Y/G, Pb/B, Pr/R, H/CS, VS)
Electrical	
Power Adapter	Input: AC 100-240V; Output: DC 24V
Power Consumption	150W (max)
Dimensions	
Dimensions (W x H x D)	618(W) x 412(H) x 99.5(D) (mm)
Weight	18.7 lbs / 8.5Kg
Operating Conditions	
Electrical Input Rating	24V DC 6.25A

1.5 Technical descriptions and documents:

No.	Document Title and Description
1	VP 472 and VP 4726F User Manual
Note: The manufacturer provided the following document.	

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1.6 Equipment Marking Plate

VP4726 Marking Plate



VP4726F Marking Plate



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1.7 Equipment Used During Test

Use*	Product Type	Manufacturer	Model	Comments
EUT	26" LCD Color Display	D&T Inc.	VP4726/ VP4726F	Medical Monitor S/N: F09E001
EUT	AC/DC Adapter	Bridgepower	JMW1150KA2400F09	Adapter of Medical Monitor S/N: 90400428
AE	PC	DELL	OPTIPLEX 755	Used for DVI, D-sub, and Optical DVI
AE	Headset	PILLAR	CH-1700	Used for DVI, Optical-DVI, and D-sub Mode
AE	Printer	SAMSUNG	ML-2250G	-
AE	USB mouse	DELL	SMOU50001WX-BK	-
AE	USB Keyboard	DELL	SK-8115	-
AE	Pattern generator	Chroma	22291	Used for C-video, S-Video and Component mode
AE	SDI Patten Generator	Quantum Data	881D	Used for SDI In mode
AE	LCD Monitor	D&T Inc	FS-L1901D	Used for SDI Out mode
AE	LCD Monitor adapter	LISHIN INTERNATIONAL ENTERPRISE CORP.	LSE9901B1260	Connected to LCD monitor

* Note: **EUT** - Equipment Under Test, **AE** - Auxiliary/Associated Equipment, **SIM** - Simulator (Not Subjected to Test)

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1.8 EUT Input/Output Ports

Port #	Name	Cable Type*	Cable Max. >3m	Shielded	Comments
1	Mains	AC	1.8 m	Unshielded	Hospital-grade AC Power cord
2	DVI In	I/O	1.8 m	Shielded	24 pin DVI-D
3	DUSB In	I/O	1.8 m	Shielded	15 pin D-Sub
4	Optical DVI	I/O	22.5m	Shielded	4 pin DVI
5	SDI In, Out	I/O	1.8 m	Shielded	BNC
6	S-Video In	I/O	1.0 m	Shielded	S-Video
7	Component (Y/Pb/Pr) In	I/O	1.8 m	Shielded	5 Port BNC
8	C-Video in	I/O	1.8 m	Shielded	C-Video

Note:

*AC = AC Power Port DC = DC Power Port N/E = Non-Electrical
 I/O = Signal Input or Output Port (Not Involved in Process Control)
 TP = Telecommunication Ports
 *RS-232 port is used for service purpose only. No user interface port.

1.9 EUT Internal Operating Frequencies

Frequency (MHz)	Description	Frequency (MHz)	Description
192.375 MHz	Memory Clock	27.00 MHz	System Clock
158.625 MHz	Display Clock	28.322 MHz	System Clock

1.10 Power Interface

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
Rated	AC 100-240	3.0	-	50~60	Single	-
1	AC 120	-	-	60	Single	Tested for Radiated and conducted emission.

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2. EUT OPERATION MODES FOR TESTING

2.1 EUT operation Modes:

Mode #	Mode	Comments
1	DVI Mode	
2	Optical DVI Mode	-
3	VGA Mode	Worst case condition
4	SDI In/Out Mode	-
5	S-VIDEO Mode	Worst case condition
6	C-Video Mode	-
7	Component (Y/Pb/Pr) Mode	-

Note:

1. All the configuration described above has been investigated during the preliminary testing and selected two cases as worst-case condition for final measurements.
2. EUT have been performed under continuous displaying "H" Patten for configuration modes of 1 to 3
3. EUT has been performed under continuous displaying "Color Bar" Patten for configuration modes of 4, 5, 6 and 7.

2.2 Used DC extension Cable for EMI Testing

Mode #	Configuration	Preliminary Test Mode	Comment
1	AC/DC Adapter Only	DVI, Optical DVI, VGA, SDI, S-Video, C-Video, Component Mode.	-
2	AC/DC Adapter with DC Extension Cable		Worst Mode

2.3 Modes of Video Resolution

Mode #		Resolution	Comments
1	VGA Mode	640 * 350 @ 60Hz	-
2		800 * 600 @ 60Hz	-
3		1024 * 768 @ 60Hz	-
4		1920 1200 @ 60Hz	Worst case condition
5	S-Video	720p60h	Worst case condition

Note: Video resolution where it refers from above is representative worst case.

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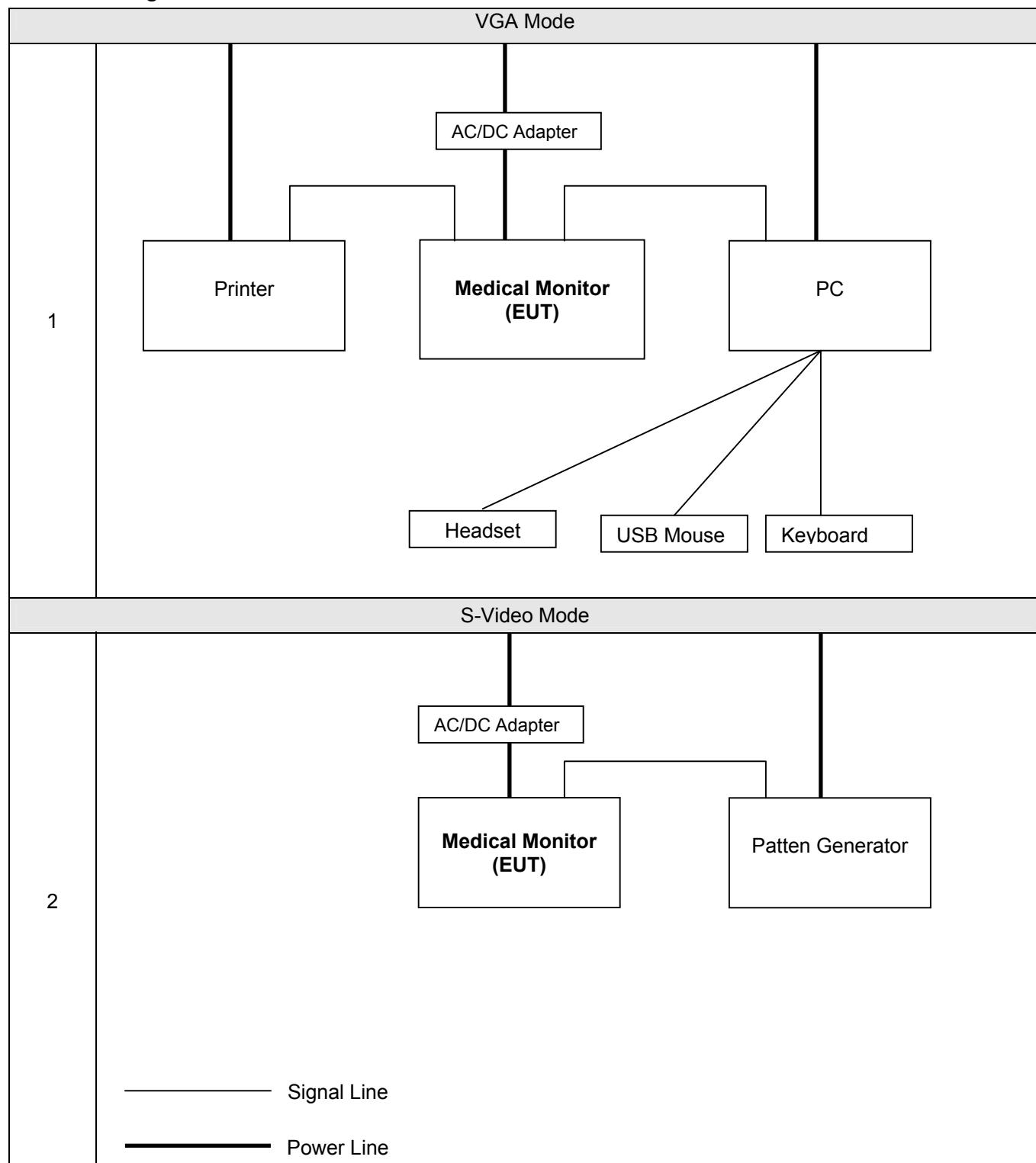
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2.4 Test Configuration:



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3. AC POWER LINE CONDUCTED EMISSION TEST

TEST: Limits of mains terminal disturbance voltage						
Method	Measurements were made on a ground plane that extends 1-meter minimum beyond all sides of the system under test. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN.					
Parameters recorded during the test	Laboratory Ambient Temperature		25.5°C			
	Relative Humidity		45.1 %			
-	Frequency range on each side of line		Measurement Point			
Fully configured sample scanned over the following frequency range	150 kHz to 30 MHz		AC Mains ports of AC/DC Adapter			
Limits - Class B						
Frequency (MHz)	Limit (dB μ V)					
	Quasi-Peak	Result	Average	Result		
0.15 to 0.50	66 to 56	Pass	56 to 46	Pass		
0.50 to 5	56	Pass	46	Pass		
5 to 30	60	Pass	50	Pass		
EUT Configuration Settings:						
Power Interface Mode # (See Section 1.10)	EUT Operation Mode # (See 2.1)		EUT Configurations Mode # (See Section 2.4)			
1 (120 V, 60 Hz)	3 (VGA mode), 5 (S-Video Mode)		1 (VGA mode), 2 (S-Video Mode)			
Conducted Emissions Test Equipment used:						
Description	Manufacturer	Model	Identifier	Cal. Due		
Test Receiver	Rohde & Schwarz	ESPI	101798	2010.04.24		
LISN	Rohde & Schwarz	ESH2-Z5	100146	2010.04.24		
LISN	Schwarzbeck	NNLK8129	8129162	2010.04.24		
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	3057.8810.54	2010.04.24		

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Figure 1. Conducted Emission Test Setup



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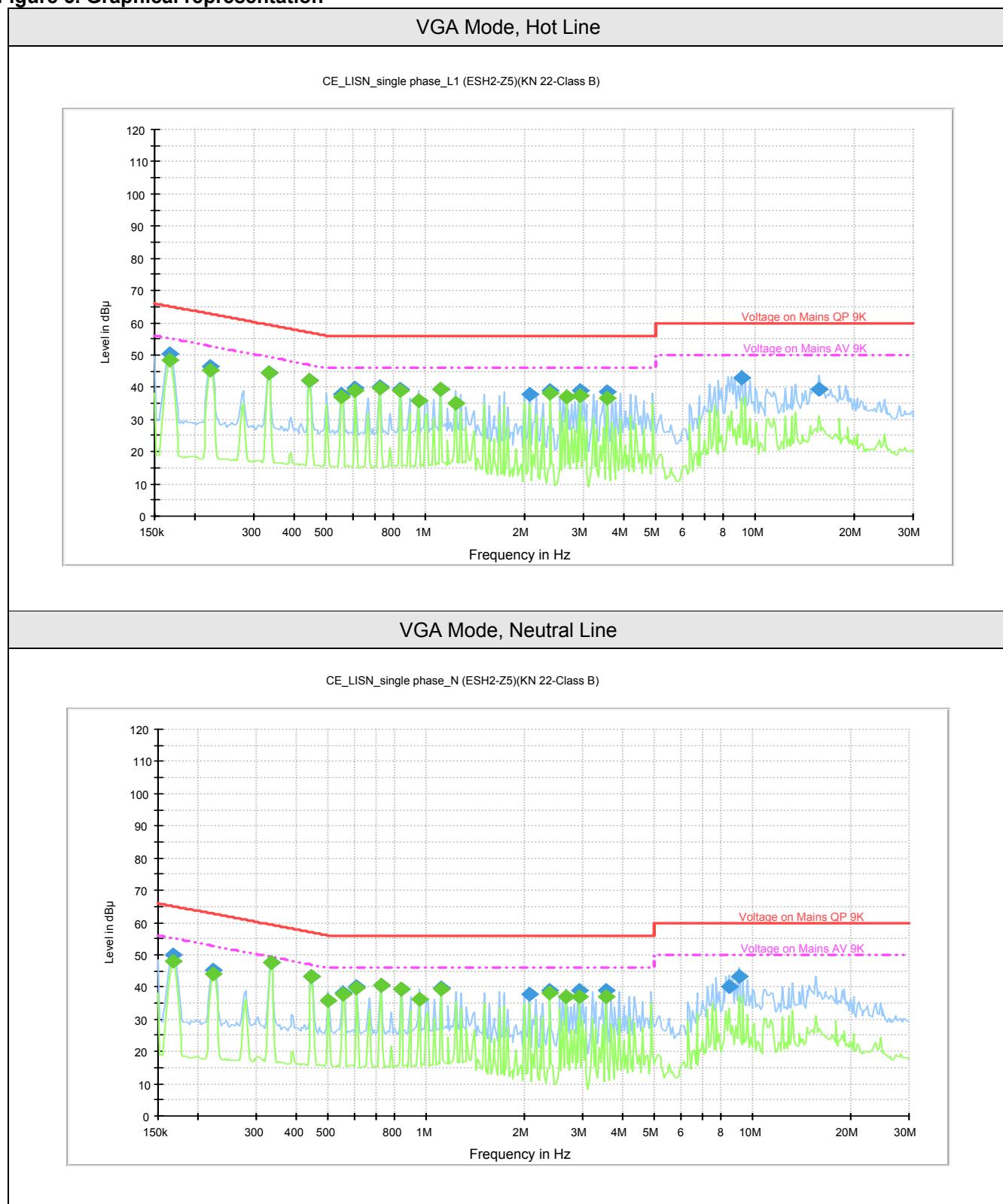
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Figure 5. Graphical representation



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Table 1. Test data for conducted emission

Test Frequency (MHz)	VGA Mode										
	Correction Factor		Reading value (dBuV)		Line	Level (dBuV)		Limit (dBuV)		Margin (dB)	
	Cable	LISN	QP	AV		QP	AV	QP	AV	QP	AV
0.167	0.14	9.76	40.6	38.4	L1	50.5	48.3	65.1	55.1	14.6	6.8
0.221	0.14	9.76	36.4	35.4	L1	46.3	45.3	62.8	52.8	16.5	7.5
0.332	0.14	9.76	37.6	37.7	N	47.5	47.6	59.4	49.4	11.9	1.8
0.722	0.11	9.79	30.7	30.6	N	40.6	40.5	56.0	46.0	15.4	5.5
1.108	0.17	9.83	29.6	29.4	N	39.6	39.4	56.0	46.0	16.4	6.6
2.054	0.22	9.88	27.8	24.9	L1	37.9	35.0	56.0	46.0	18.1	11.0
2.384	0.22	9.88	28.9	28.2	N	39	38.3	56.0	46.0	17.0	7.7
2.938	0.28	9.92	28.8	27.0	L1	39	37.2	56.0	46.0	17.0	8.8
3.550	0.23	9.97	28.6	26.9	N	38.8	37.1	56.0	46.0	17.2	8.9
8.438	0.42	10.08	29.5	22.5	N	40.0	33.0	60.0	50.0	20.0	17.0
9.046	0.4	10.1	33	17.5	N	43.5	28.0	60.0	50.0	16.5	22.0
15.482	0.86	10.04	28.3	21.6	L1	39.2	32.5	60.0	50.0	20.8	17.5

Note:

1. Margin (dB)= Limit (dBuV) - Level (dBuV)
2. If no frequencies are specified in the tables, no measurement for quasi-peak or average was necessary.

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Figure 2. Conducted Emission Test Setup

S-Video Mode



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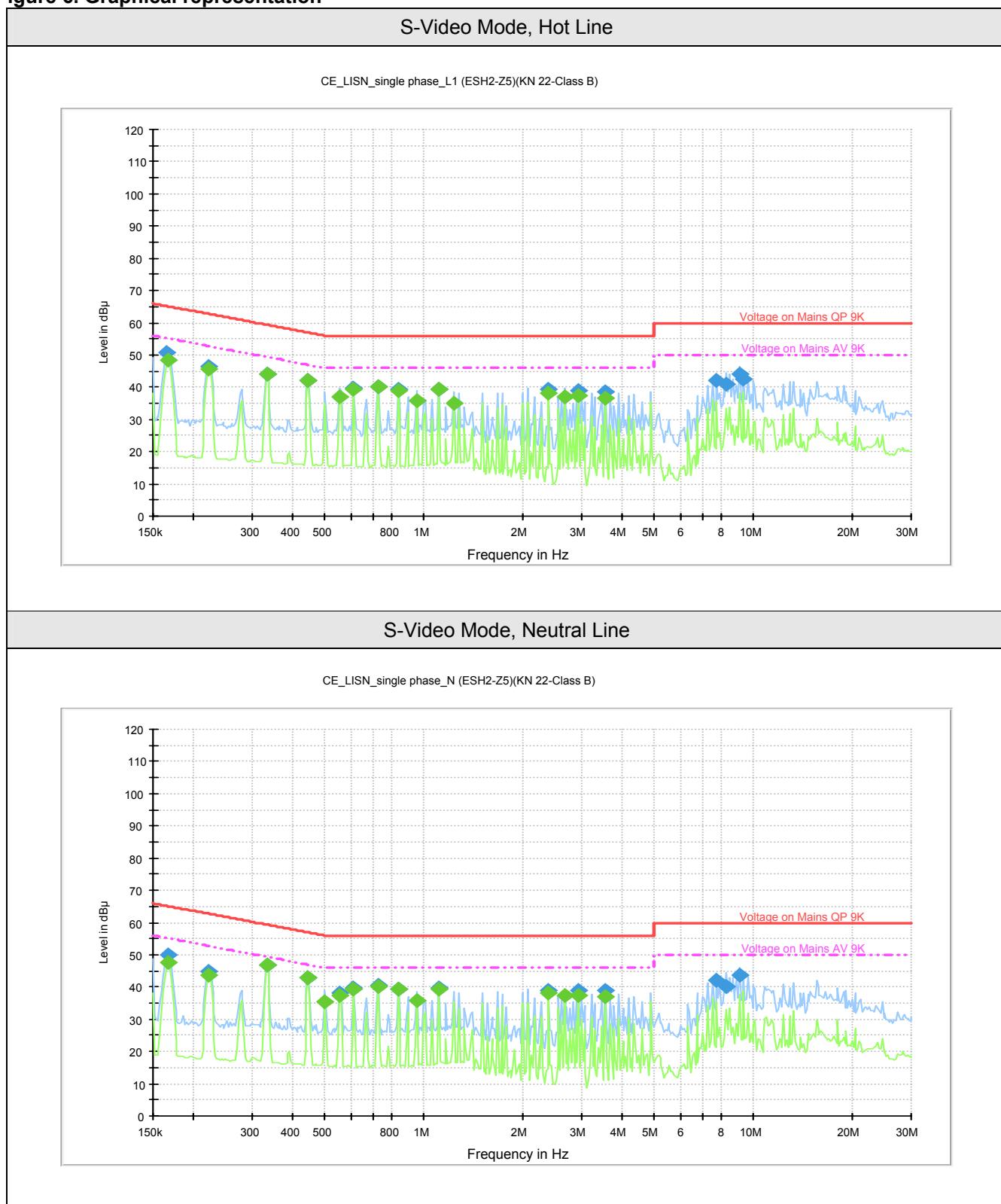
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Figure 6. Graphical representation



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Table 1. Test data for conducted emission

Test Frequency (MHz)	S-Video Mode										
	Correction Factor		Reading value (dBuV)		Line	Level (dBuV)		Limit (dBuV)		Margin (dB)	
	Cable	LISN	QP	AV		QP	AV	QP	AV	QP	AV
0.165	0.15	9.75	40.7	38.6	L1	50.6	48.5	65.2	55.2	14.6	6.7
0.221	0.14	9.76	36.6	35.7	L1	46.5	45.6	62.8	52.8	16.3	7.2
0.332	0.14	9.76	36.9	37	N	46.8	46.9	59.4	49.4	12.6	2.5
0.443	0.12	9.78	33.1	33.1	N	43.0	43.0	57.0	47.0	14.0	4.0
1.108	0.18	9.82	29.6	29.3	N	39.6	39.3	56.0	46.0	16.4	6.7
2.384	0.22	9.88	29.1	28.1	L1	39.2	38.2	56.0	46.0	16.8	7.8
2.938	0.32	9.88	28.9	27.2	L1	39.1	37.4	56.0	46.0	16.9	8.6
3.550	0.23	9.97	28.6	26.8	N	38.8	37.0	56.0	46.0	17.2	9.0
7.715	0.43	10.07	31.5	25	L1	42.0	35.5	60.0	50.0	18.0	14.5
8.271	0.42	10.08	30.5	23.5	L1	41.0	34.0	60.0	50.0	19.0	16.0
9.046	0.5	10.1	33.5	16.4	L1	44.1	27.0	60.0	50.0	15.9	23.0
9.320	0.5	10.1	32.1	20.4	L1	42.7	31.0	60.0	50.0	17.3	19.0

Note:

1. Margin (dB)= Limit (dBuV) - Level (dBuV)
2. If no frequencies are specified in the tables, no measurement for quasi-peak or average was necessary.

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4. RADIATED EMISSION TEST

TEST: Limits for radiated disturbance				
Method	A pretest was performed at 3m distances in an anechoic screened enclosure, scanning the frequency range, and locating any frequencies at which the EUT radiated. Frequency scans were conducted with a peak detector with horizontal and vertical polarization of the antenna. Measurements were done in the frequency range 30-2000 MHz. The main test was then conducted by measurements at each frequency found in the pretest. These measurements were done at an open area test site at 10m distances, with a quasi-peak detector. EUT was positioned on a wooden table 0.8m above the floor, at the edge of the turntable. Cables connected to EUT were fixed to cause maximum emission. A maximum emitting point for each frequency was found by turning EUT 0-360 degrees, and adjust the antenna height between 1-4m. A quasi-peak detector measurement was then done at the maximum emitting point.			
Parameters recorded during the test		Laboratory Ambient Temperature		26.8°C
		Relative Humidity		51.2%
-		Frequency range		Measurement Point
Fully configured sample scanned over the following frequency range		30 MHz – 2.0 GHz		10 and 3meter measurement distance
Limits – Class B				
Frequency (MHz)		Limit (dB μ V/m)		
		Quasi-Peak		Results
30 to 230		30 (10.0 meter)		Pass
230 to 1000		37(10.0 meter)		Pass
1000 to 2000		54 (Average), 74 (Peak) (3.0 meter)		Pass
EUT Configuration Settings:				
Power Interface Mode # (See Section 1.10)		EUT Operation Mode # (See 2.1)		EUT Configurations Mode # (See Section 2.4)
1 (120 V, 60 Hz)		3 (VGA mode), 5 (S-Video Mode)		1 (VGA mode), 2 (S-Video Mode)
Radiated Emissions Test Equipment:				
Description	Manufacturer	Model	Identifier	Cal. Due
Test Receiver	Rohde & Schwarz	ESIB26	100359	2010.04.24
BICONILOG ANT	Schaffner	CBL6112D	22022	2010.04.21
HORN ANTENNA	Schwarzbeck	BBHA9120D	9120D-539	2010.03.24
Antenna Mast	Inn-co	MA 4000	-	-
Turntable	Inn-co	DT 3000	-	-

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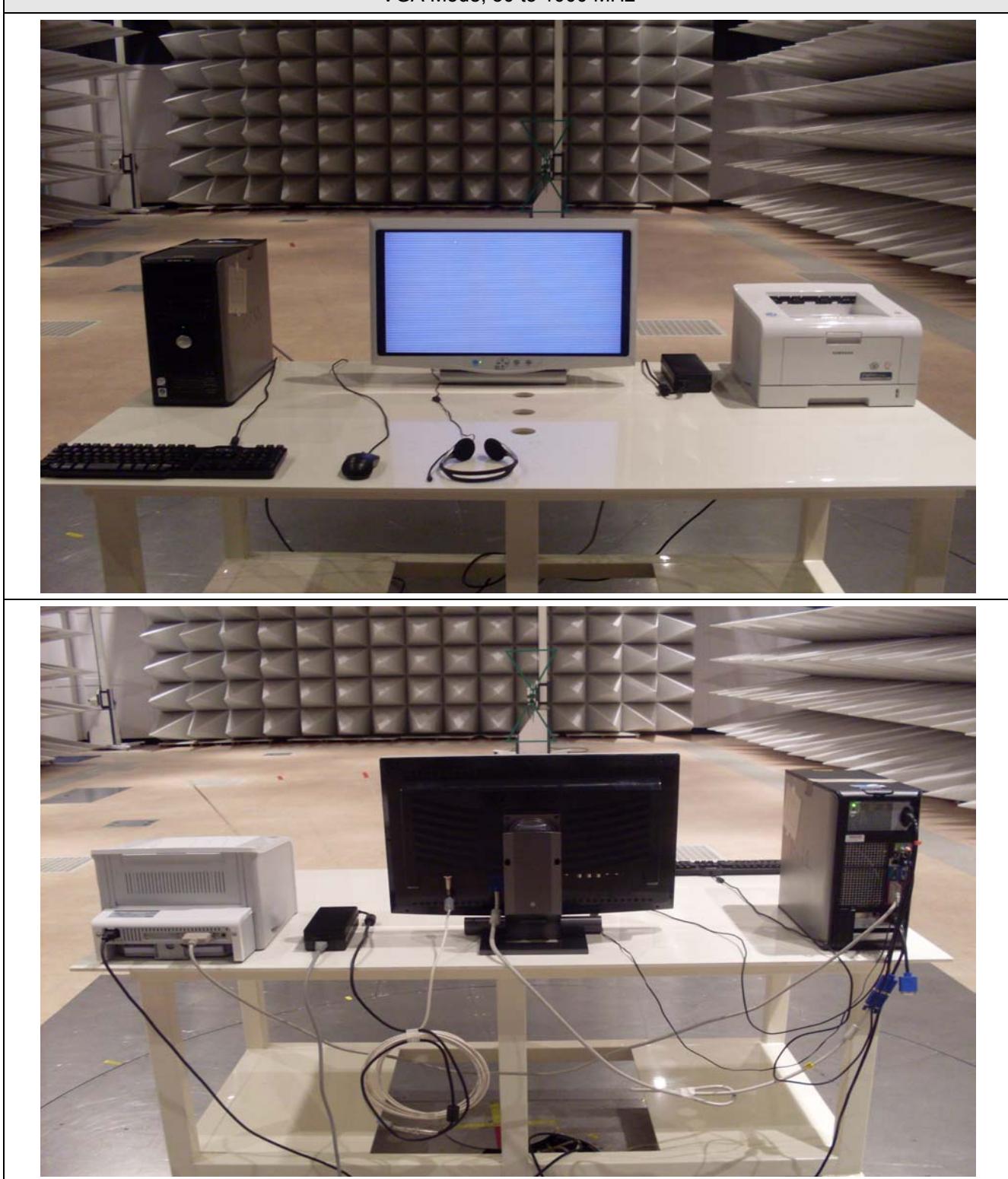
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Figure 9, Photo of Radiated emission test setup

VGA Mode, 30 to 1000 MHz



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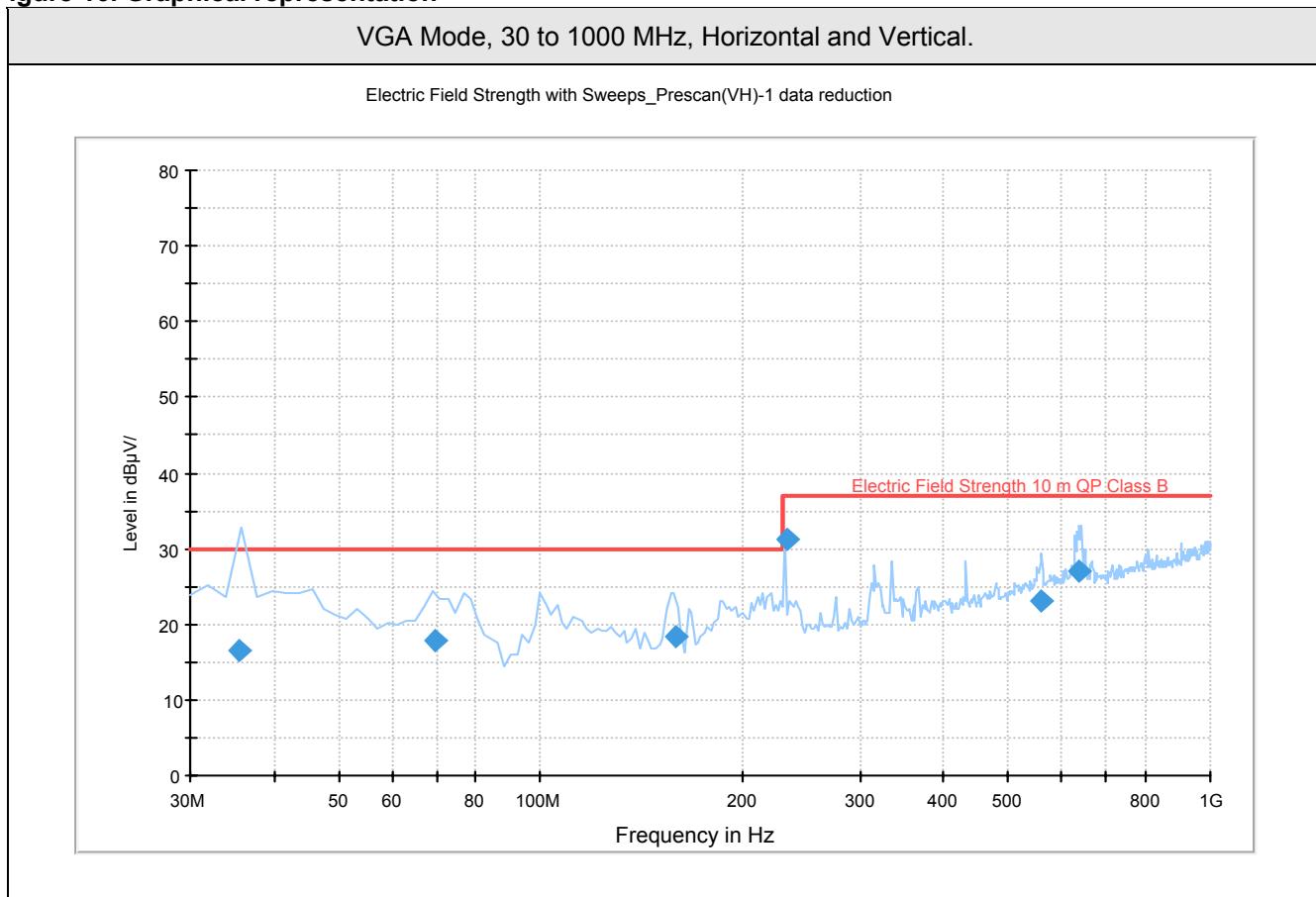
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Figure 16. Graphical representation**Table 4. Radiated emission Test data**

VGA Mode, 30 to 1000 MHz										
Test Frequency (MHz)	Meter Reading (dB μ V)	Detector (Pk/QP)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (m)	Gain/Loss Factor (dB)	Antenna Factor (dB/m)	Level dB μ V/m	Limit dB μ V/m	Margin (dB)
69.85	10.40	QP	V	55	3.05	1.29	6.31	18.0	30.0	12.0
158.88	6.20	QP	V	341	1.05	1.77	10.43	18.4	30.0	11.6
233.10	16.50	QP	H	117	3.95	1.62	13.18	31.3	37.0	5.7
560.0	1.20	QP	V	0	2.05	3.11	18.69	23.0	37.0	14.0
637.75	4.60	QP	V	337	2.05	3.81	18.69	27.1	37.0	9.9

Note:

1. Margin (dB)= Limit (dB μ V) - Level (dB μ V)
2. If no frequencies are specified in the tables, no measurement for quasi-peak or average was necessary.

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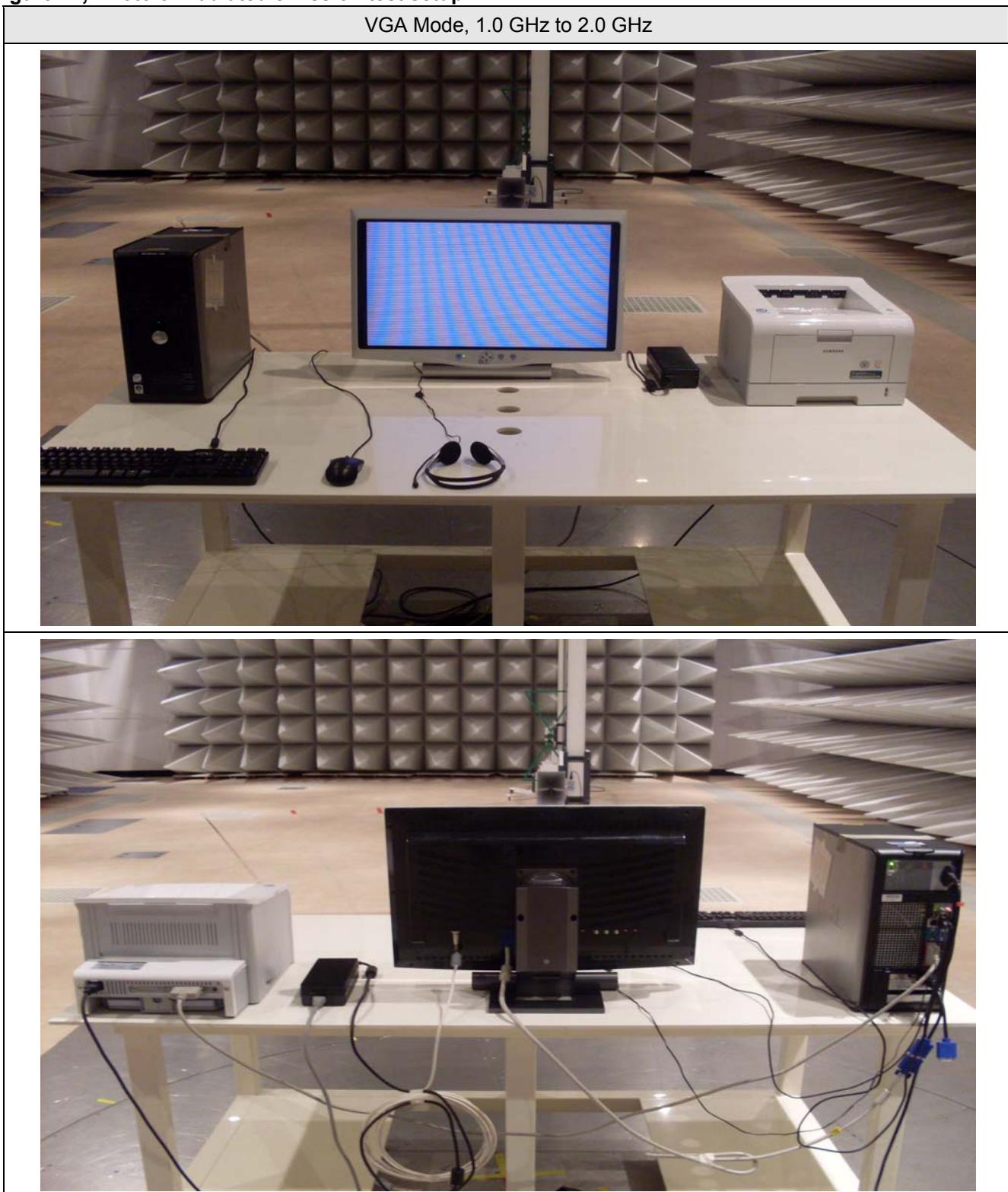
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Figure 11, Photo of Radiated emission test setup

VGA Mode, 1.0 GHz to 2.0 GHz



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Figure 16. Graphical representation



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 Client Name: D&T Inc.

Table 5. Radiated emission Test data

VGA Mode, 1.0 GHz to 2.0 GHz											
Test Frequency (MHz)	Meter Reading (dBuV)	Detector (Pk/AV)	Pol (V/H)	Azimuth	Antenna Height (m)	AMP Gain (dB)	Antenna Factor (dB/m)	Cable loss (dB)	Level dBuV/m	Limit dBuV/m	Margin (dB)
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

Note: The test results were under required limit with 10 dB margins or more.

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Model Number:

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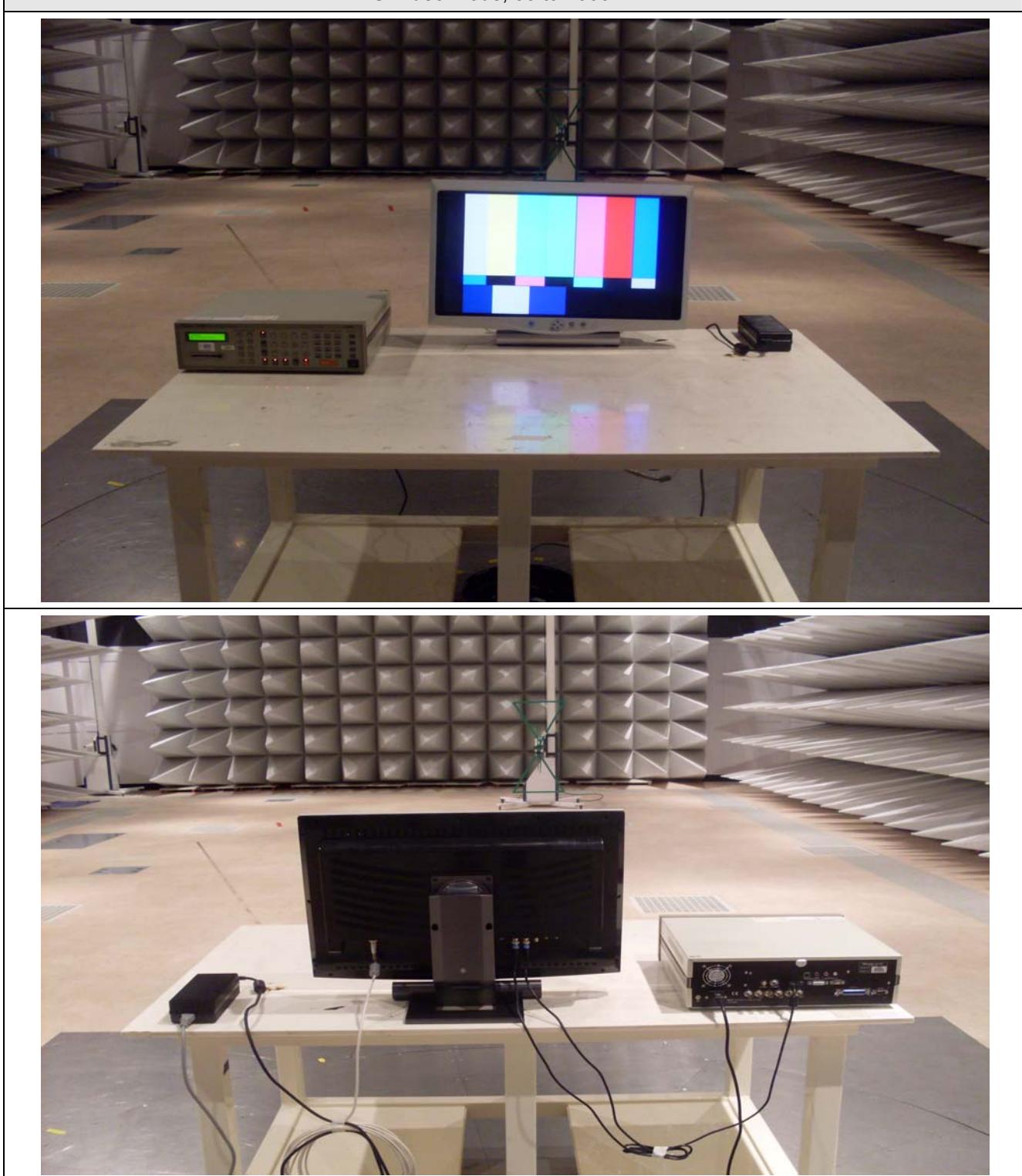
Date of Issue: August 31, 2009

Client Name:

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Figure 9, Photo of Radiated emission test setup

S-Video Mode, 30 to 1000 MHz



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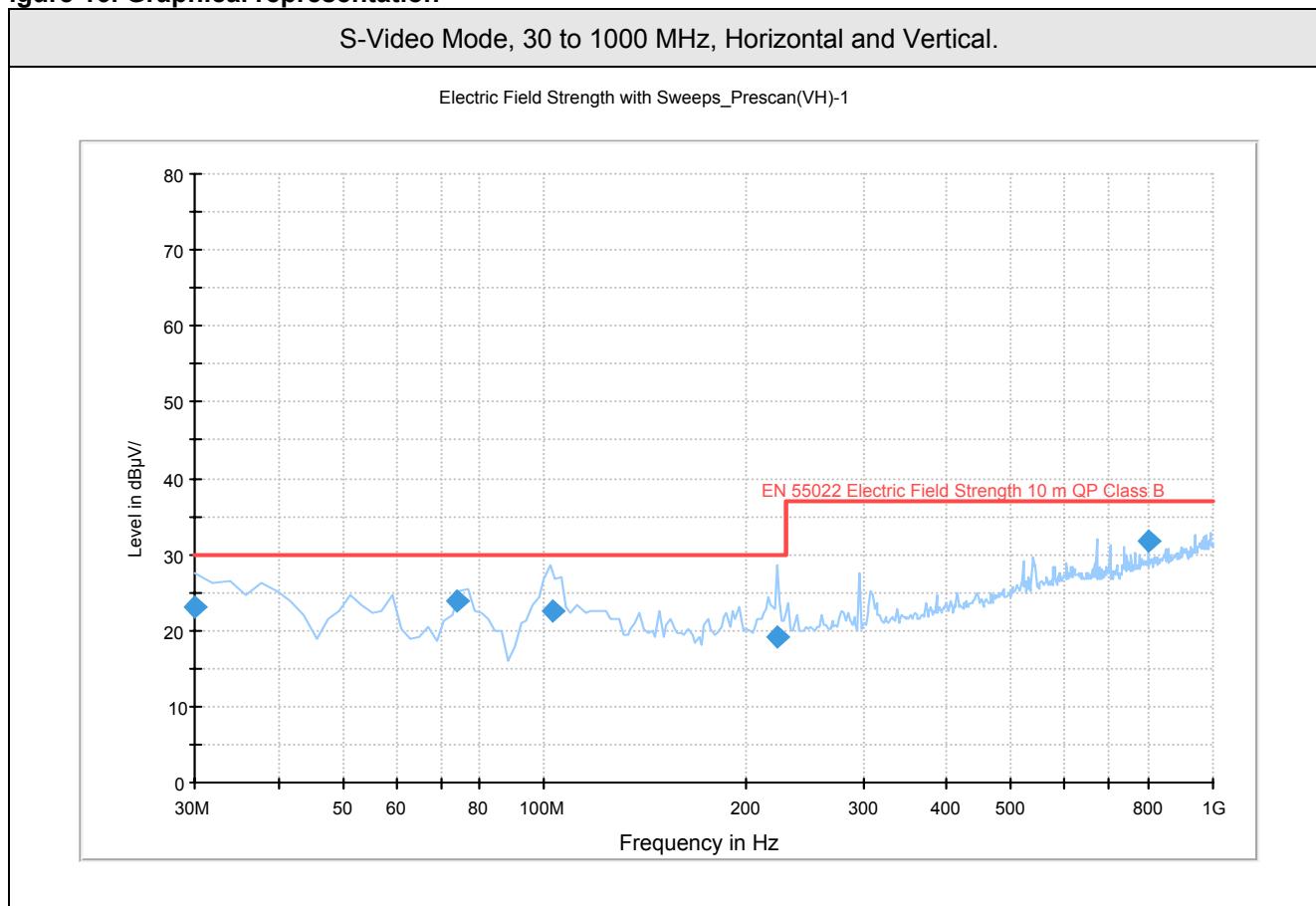
Model Number:

VP 4726

Date of Issue: August 31, 2009

Client Name:

D&T Inc.

Figure 16. Graphical representation**Table 4. Radiated emission Test data**

S-Video Mode, 30 to 1000 MHz										
Test Frequency (MHz)	Meter Reading (dBuV)	Detector (Pk/QP)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (m)	Gain/Loss Factor (dB)	Antenna Factor (dB/m)	Level dBuV/m	Limit dBuV/m	Margin (dB)
35.89	0.70	QP	V	5	4.00	0.62	15.98	17.3	30.0	12.7
101.74	5.50	QP	V	53	1.05	1.82	10.58	17.9	30.0	12.1
148.53	0.20	QP	H	273	3.05	1.97	10.43	12.6	30.0	18.4
232.39	15.30	QP	H	106	4.00	1.52	13.18	30.0	37.0	7.0
336.01	9.70	QP	H	329	4.00	1.61	16.09	27.4	37.0	9.6

Note:

1. Margin (dB)= Limit (dBuV) - Level (dBuV)

2. If no frequencies are specified in the tables, no measurement for quasi-peak or average was necessary.

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D&T Inc.

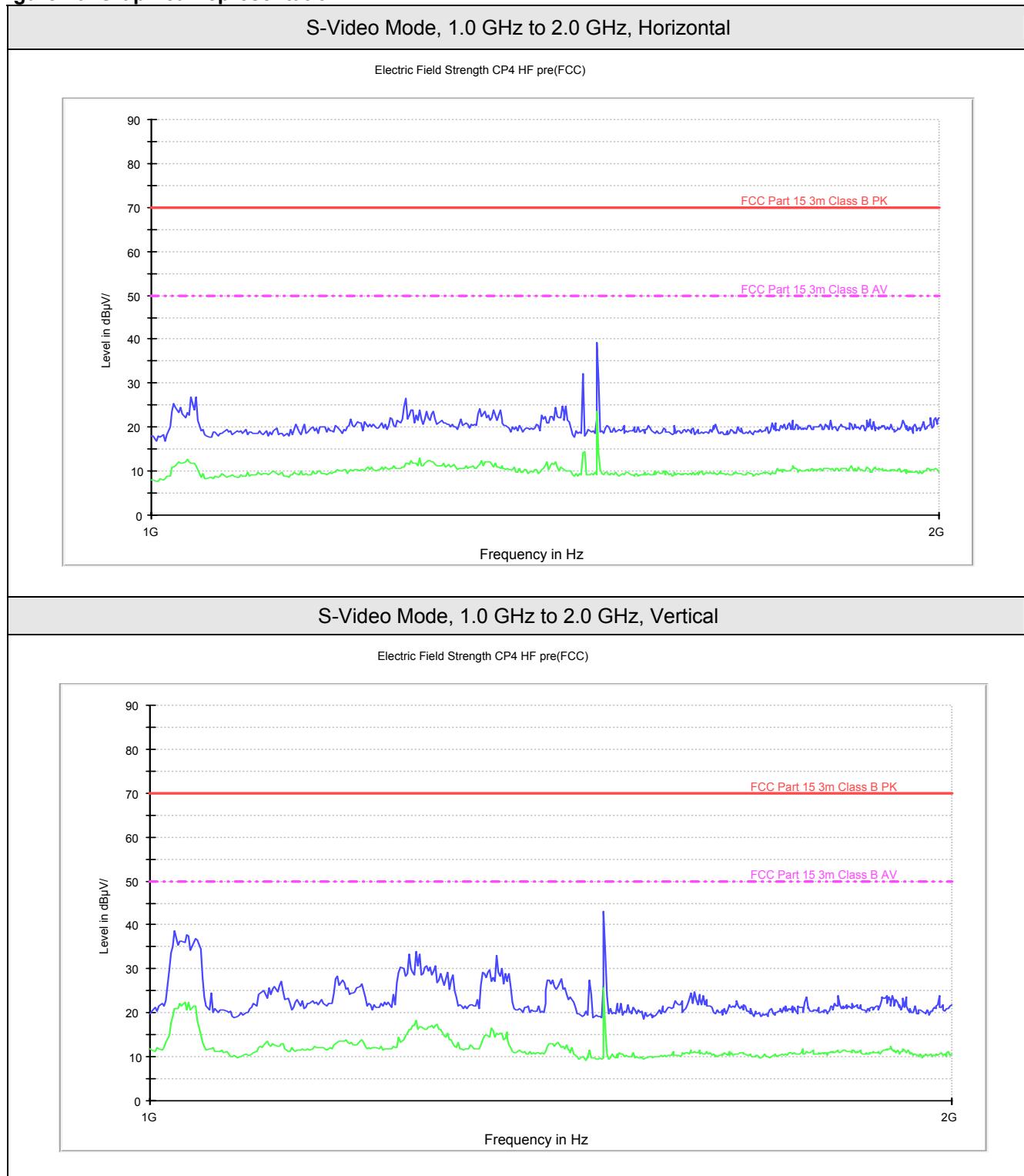
Figure 11, Photo of Radiated emission test setup

S-Video Mode, 1.0 GHz to 2.0 GHz



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Figure 16. Graphical representation



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 Client Name: D&T Inc.

Table 5. Radiated emission Test data

S-Video Mode, 1.0 GHz to 2.0 GHz										
Test Frequency (MHz)	Meter Reading (dBuV)	Detector (Pk/AV)	Pol (V/H)	Antenna Height (m)	AMP Gain (dB)	Antenna Factor (dB/m)	Cable loss (dB)	Level dBuV/m	Limit dBuV/m	Margin (dB)
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
Note: The test results were under required limit with 10dB margin or more.										

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5. MEASUREMENT UNCERTAINTY

Measurement Uncertainty	
All measurements involve certain levels of uncertainties, especially 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 CISPR 16-4-2, the measurement uncertainty level with a 95% confidence level was applied	
Conducted emission measurement :(k=2, 95%)	
Frequency	dB
9kHz-150 kHz	± 3.05 [dBuV]
150kHz-30 MHz	± 2.53 [dBuV]
Radiated Emission measurement :(k=2, 95%)	
30-300 MHz	3 m: ±3.53 [dBuV/m], 10 m: ± 3.52 [dBuV/m]
300-1000 MHz	3 m: ±3.70 [dBuV/m], 10 m: ± 3.69 [dBuV/m]

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Client Name: D&T Inc.

6. Affidavit for Multilisting Model Description



AFFIDAVIT FOR MULTILISTING MODEL DESCRIPTION

We hereby confirm that the LCD Monitor, model VP4726 manufactured by, as a D&T Inc., as a basic application, has several multilisting models as described below and these multilisting models are the same as basic model except the model name designation and are the same characteristic and construction in electronically and mechanically. So, we declare that these multilisting models to be added on the basic application could be applied without any further engineering investigation and evaluation.

We have a responsible for the compliance of all variants.

Basic model : VP4726

Multilisting model : VP4726F

Sincerely,

A handwritten signature in black ink, appearing to read 'YongHee Han'.

Signature

Typed Name : YongHee Han
Title : Senior Engineer
Company : D&T Inc.

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<http://www.dntinc.co.kr> TEL. +82-42-380-8000 FAX. +82-42-380-8005

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Client Name: D&T Inc.

7. Accreditations and Authorizations



KCC: Designated as a testing laboratory by Radio Research Agency in accordance with the Regulation on Designation of Testing Laboratory for Information and Communication Equipment. Registration No. : KR020



FCC: Details of the measurement facilities used for these tests have been filed with the Federal Communications Commission's Laboratory in Columbia, Maryland and accepted in a letter dated May 30, 2007 (Reg. No. 90762). As a Conformity Assessment Body (CAB), our organization is designated to perform compliance testing on equipment subject to Declaration Of Conformity (DOC) and Certification under Part 15 and 18 of the Commission's Rules in a letter dated September 6, 2006 (Reg. No. 614154).