



UL Korea, Ltd

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Project: 08CA10346
File: TC8312
Report: 08CA10346-FCC
Date: February 26, 2008
Model: FS-L4201C

Electromagnetic Compatibility Test Report

FCC Certification Part 15 Subpart B Class B

For

D&T Inc.

Daedeok Valley, 60-1, Jang Dong, Yuseong Gu, Daejeon, 305-343, Korea

UL Korea Ltd.

33rd Fl. Gangnam finance Center, 737 Yeoksam-Dong, Kangnam-Gu, Seoul, 135-984, Korea
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quality service for over 100 years*

Project Number: 08CA10346 File Number TC8312 Test Report No: 08CA10346-FCC
Model Number: FS-L4201C Date of Issue: February 26, 2008

TEST REPORT DETAILS

Test report No: 08CA10346-FCC
Tests Performed By: UL Korea Ltd.
33rd FL. Gangnam Finance Center, 737 Yeoksam-dong,
Kangnam-ku, Seoul, 135-984, Korea

Test site: SK Tech CO., LTD.
820-2 Wolmoon-Ri, Wabu-Up Namyangju-Si, Kyunggi-Do, Korea

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

Tests Performed For: D&T Inc.
Daedeok Valley, 60-1, Jang Dong, Yuseong Gu, Daejeon,
305-343, Korea

Manufacturer: D&T Inc.
Daedeok Valley, 60-1, Jang Dong, Yuseong Gu, Daejeon,
305-343, Korea

Applicant Contact: W.W.Lee
Title: General Manager / QA
Phone: 82-42-360-0820
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Test Report Date: January 26, 2008

Product Type: 42" Color TFT LCD Monitor
Trademark: TANDBERG
Model Number: FS-L4201C
FCC ID: THCFS-L4201C
Product standards: FCC Part 15 Subpart B Class B

Sample Serial Number: None (Proto type)

Sample Receive Date: February 18, 2008

Testing Start Date: February 19, 2008

Date Testing Complete: February 26, 2008

Overall Results: **PASS**

UL Korea Ltd. reports apply only to the specific samples tested under stated test conditions. 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.

Project Number: 08CA10346
Model Number: FS-L4201C

File Number TC8312

Test Report No: 08CA10346-FCC
Date of Issue: February 26, 2008

TEST SUMMARY

Test Result

Requirement – Test	Reference standards	Verdict
AC Power line Conducted Emission Test	47CFR Part 15.107(a) / 47CFR Part 15.109(g)	Complied
Radiated Emission Test		Complied

The tests listed in the Summary of Testing section of this report have been performed and the results recorded by UL Korea, Ltd. in accordance with the procedures stated in each test requirement and specification. The applicant determined the list of tests performed were applicable to the Equipment Under Test. 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.
February 26, 2008



Reviewed by
Kyung Yong, Kim, Senior Project Engineer
Conformity Assessment Services - 3014ASEO
UL Korea Ltd.
February 26, 2008

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1. EQUIPMENT UNDER TEST (EUT)

1.1 Equipment Description

The following is specification provided by the manufacturer.

Item		SPECIFICATION	UNIT	NOTE
Display area	diagonal	1067.308	mm	-
	viewable	930.25(H) × 523.01(V)	mm	-
Driver element		a-Si TFT Active matrix	-	-
Number of Pixels		1366x768, 1.05Million	pixels	-
Pixel Pitch		0.681(H) × 0.227(V)	mm	-
Pixel arrangement		R. B, G Vertical Stripe	-	-
Display colors		16.7M (RGB 8-bit data)	-	-
Viewing angle		178(H), 178(V)	degrees	15~20minutes after lighting on
Display mode		Normally black	-	
AC power voltage and frequency		AC 100 ~ 240V±10%, 60Hz/50Hz±3Hz		
DC Power Supply (Internal AC-DC Multi power SMPS)				
Line input voltage range		100 ~ 240 VAC		
Line input frequency range		50~60 Hz ±3Hz		
Power factor		more than 0.9		
Power Consumption		Maximum 300W		
		Standby Mode Under 20W		
Leakage current		less than 3.5mA at AC 240V/50Hz		
Synchro nization		Horizontal Frequency: 91 kHz (Max.)		
		Vertical Frequency: 85 Hz (Max.)		
Input Signal		Analog RGB		
		DVI Digital		
		S/PDIF (Coaxial)		
Dimension		1022 X 615 X 98 / 29 kg		

1.2 Equipment Marking Plate

TANDBERG 42" Color TFT LCD Monitor
FS-L4201C
AC100-240V~ 50-60Hz 3A MAX
Made in Korea
Manufactured by D&T Inc. 92949432 1006 Rev.02

Apparatet må tilkoples jordat stikkontakt. Apparaten skall anslutas till jordat uttag.
Laitte on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan.
This equipment must be earthed.  AVIS: Risque de choc électrique-Ne pas ouvrir.
Warning: Shock Hazard: Do not open.
This Product complies with IEC/EN60950-1, IEC/EN55022 Class B,
IEC/EN55024 & IEC/EN61000-3-2/-3-3.
FCC ID:THCFS-L4201C
This device complies with part 15 of the FCC rules.
Operation is subject to the following two conditions:
(1) This device may not cause harmful interference &
(2) This device must accept any interference received, including
interference that may cause undesired operation.


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DBT-L4201C0701000B(B)

HF09005-7010A

제 품 명 : 42" LCD 모니터
모 델 명 : FS-L4201C
정격 입력 : 100-240V~ 50-60Hz 3A
제 조 자 : (주)디앤티
제조 국가 : 대한민국
A/S연락처 : 080-002-9004


E216998



N1246

TANDBERG
TFT-LCD 彩色显示器 型号(型號) : FS-L4201C 韩国制造(韓國製造)
彩色顯示器 輸入(輸入) : AC100-240V~ 50-60Hz 3A MAX
製造商(製造商) : D&T Inc.
型式認證服務有限公司
台北市龍江路102號2F-3 電話 +886 2 2874 7867


T35006

1.3 Equipment Used During Test

Use*	Product Type	Manufacturer	Model	Comments
EUT	42" Color TFT LCD Monitor	D&T Inc.	FS-L4201C	-
AE	PC	HP	Pavilion Media Center PC m8000	Connected to EUT through the D-sub Cable and DVI Cable.
AE	Keyboard	HP	SK-1688	-
AE	Mouse	Logitech Inc.	M-BJ58	-
AE	Resistor	SUN KWANG	M-BJ58	8 ohm

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

1.4 EUT Input/Output Ports

Port #	Name Type*	Cable Max. >3m	Cable	Shielded	Comments
1	DVI	I/O	1.8 m	Shielded	24Pin DVI Connector for Digital TMDS
2	DSUB	I/O	2.0 m	Shielded	15 Pin D-Sub Connector for Analog RGB
3	Audio In	I/O	1.0 m	Shielded	RCA Coaxial S/PDIF Audio input
4	Speakers	I/O	2.5 m	Unshielded	9 Pin D-Sub connector for Speaker Out

Note:
 *AC = AC Power Port D.C = DC Power Port N/E = Non-Electrical
 I/O = Signal Input or Output Port (Not Involved in Process Control)
 TP = Telecommunication Ports

1.5 EUT Internal Operating Frequencies

Frequency (MHz)	Description	Frequency (MHz)	Description
27.00 MHz	System Clock	85 MHz	Display Clock
28.322 MHz	TMDS Clock	152 MHz	Memory Clock

1.6 Power Interface:

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
Rated	100 ~ 240 VAC	-	-	50~60 Hz	Single	-
1	120 VAC	-	-	60 Hz	Single	-

2. EUT Operation Modes for EMC

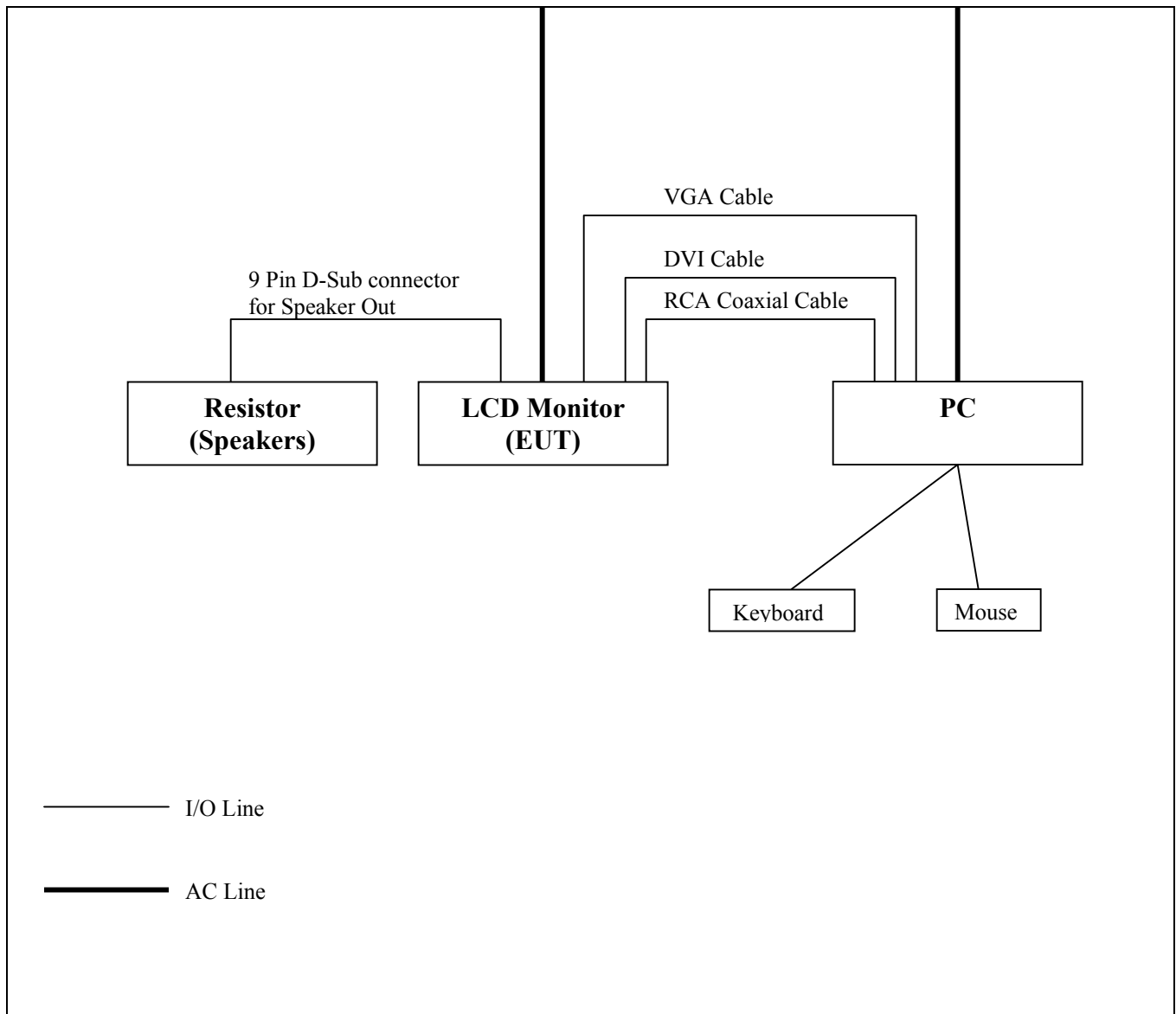
2.1 Modes of EMI Testing

Mode	Mode	Comment
1	VGA Mode	-
2	DVI Mode	-
Note <ol style="list-style-type: none"> Testing has been performed under continuous displaying "H" Patten for configuration modes of 1,2 Radiation test was performed for both VGA mode and DVI mode 		

2.2 Modes of Video resolution

12 Modes of Video Resolution			
Mode	Mode	Resolution	Comment
1	VGA Mode	800 * 600 @ 60 Hz	-
2		1024 * 768 @ 75Hz	-
3		1366 * 768 @ 60Hz	Worst case condition
4	DVI Mode	800 * 600 @ 60 Hz	-
5		1024 * 768 @ 75Hz	-
6		1366 * 768 @ 60Hz	Worst case condition
Note 1. Video resolution where it refers from above is representative worst case. 2. The worst-case emission mode has been determined by the preliminary testing for all the video resolution modes described above.			

3. EUT Configurations:



4. CONDUCTED EMISSION

	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 required prior to the test		Laboratory Ambient Temperature		10 to 40 °C	
		Relative Humidity		10 to 90 %	
Parameters recorded during the test		Laboratory Ambient Temperature		22 °C	
		Relative Humidity		36 %	
		Frequency range on each side of line		Measurement Point	
Fully configured sample scanned over the following frequency range		150 kHz to 30 MHz		Mains	
Limits – Class A					
Frequency (MHz)	Limit (dBµV)				
	Quasi-Peak	Results	Average	Results	
0.15 to 0.50	79	N/A	66	N/A	
0.50 to 30	73	N/A	60	N/A	
Limits – Class B					
Frequency (MHz)	Limit (dBµV)				
	Quasi-Peak	Results	Average	Results	
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	
Supplementary information: None					
Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Test Receiver	ROHDE&SCHWARZ	ESHS 10	862970/019	2007-7-24	2008-07-24
LISN	ROHDE&SCHWAR	ESH2-Z5	834549/011	2007-7-25	2008-7-25
LISN	ROHDE&SCHWAR	ESH3-Z5	836679/018	2007-7-25	2008-7-25

Figure 1. Conducted Emission Test Setup
Test Condition: VGA and DVI Mode

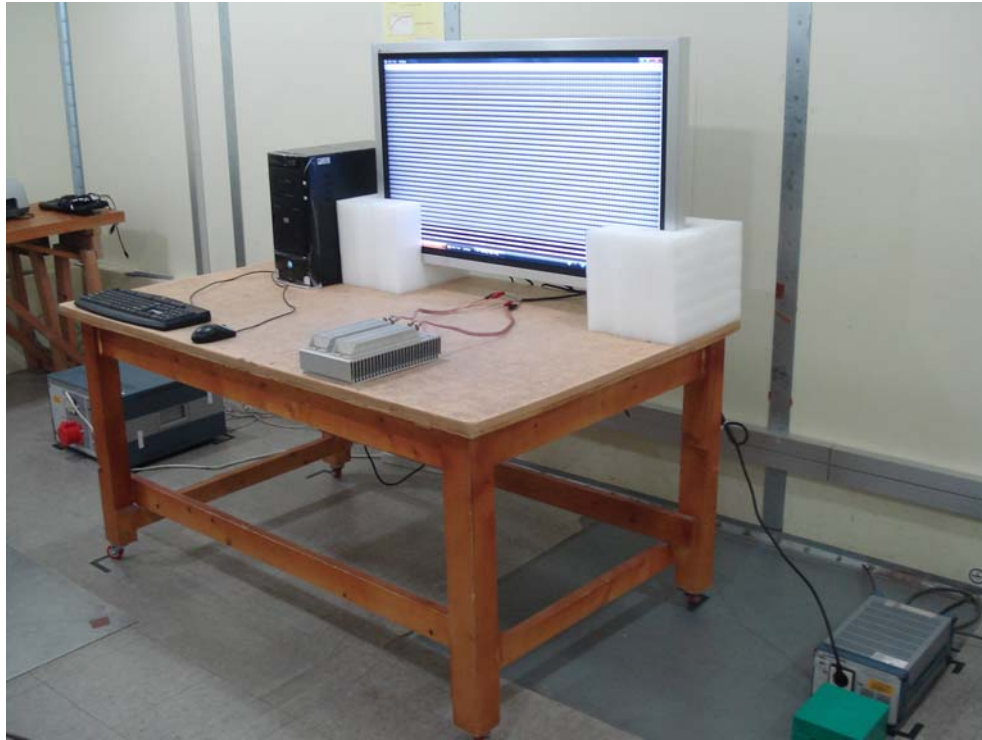


Table 1.

Test data for conducted emission: VGA Mode

Test Frequency (MHz)	Correction Factor		Reading value (dBuV)		Line	Level (dBuV)		Limit (dBuV)		Margin (dB)	
	Cable	LISN	QP	AV		QP	AV	QP	AV	QP	AV
0.15	0.2	0.05	34.40	21.23	N	34.60	21.43	66.00	56.00	31.40	34.57
0.20	0.2	0.14	30.75	24.13	L	31.07	24.45	63.51	53.51	32.45	29.16
0.93	0.1	0.14	20.04	14.28	L	20.30	14.54	56.00	46.00	35.70	31.46
12.36	0.5	0.51	25.94	17.09	L	26.93	18.08	60.00	50.00	33.07	31.92
16.87	0.5	0.65	27.76	22.61	N	28.94	23.79	60.00	50.00	31.06	26.21
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.											

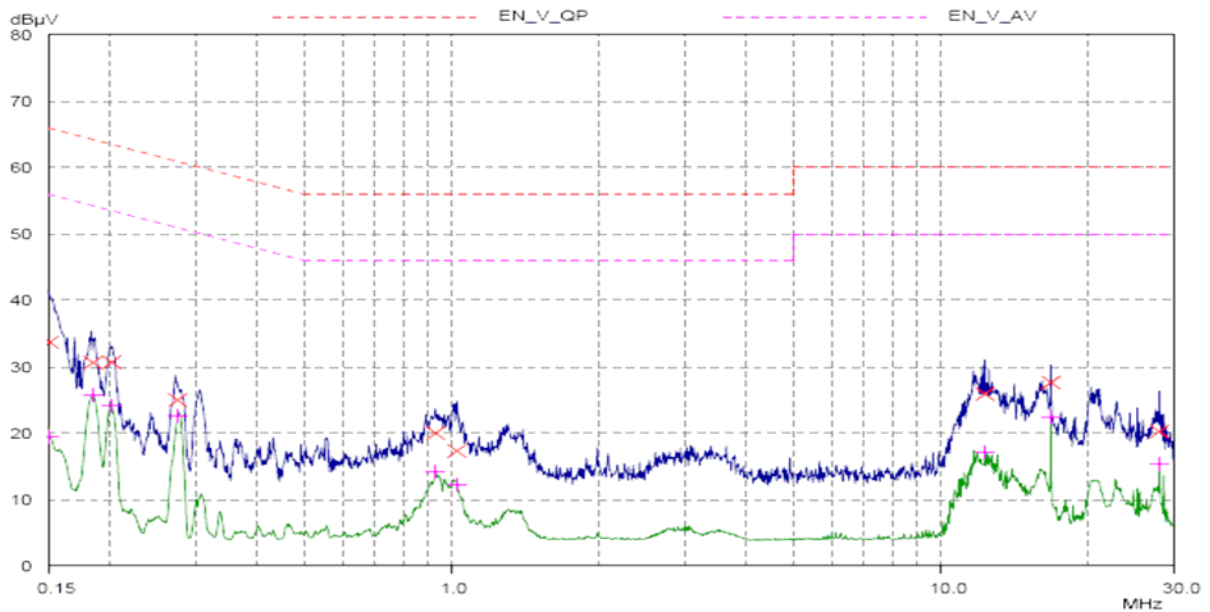
Table 2.

Test data for conducted emission: DVI Mode

Test Frequency (MHz)	Correction Factor		Reading value (dBuV)		Line	Level (dBuV)		Limit (dBuV)		Margin (dB)	
	Cable	LISN	QP	AV		QP	AV	QP	AV	QP	AV
0.15	0.2	0.05	34.63	22.73	L	34.83	22.93	66.00	56.00	31.17	33.07
0.18	0.1	0.09	31.31	25.65	N	31.47	25.81	64.49	54.49	33.01	28.67
0.27	0.1	0.13	25.03	20.18	L	25.24	20.39	61.12	51.12	35.88	30.73
1.02	0.4	0.14	18.69	12.73	N	19.19	13.23	56.00	46.00	36.81	32.77
11.77	0.3	0.49	22.94	16.12	N	23.75	16.93	60.00	50.00	36.25	33.07
28.11	0.4	0.83	22.22	17.33	L	23.49	18.60	60.00	50.00	36.51	31.40
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.											

Figure 2. Graphical representation of conducted emissions
Operating condition: VGA Mode

Line Polarity: Hot



Line Polarity: Neutral

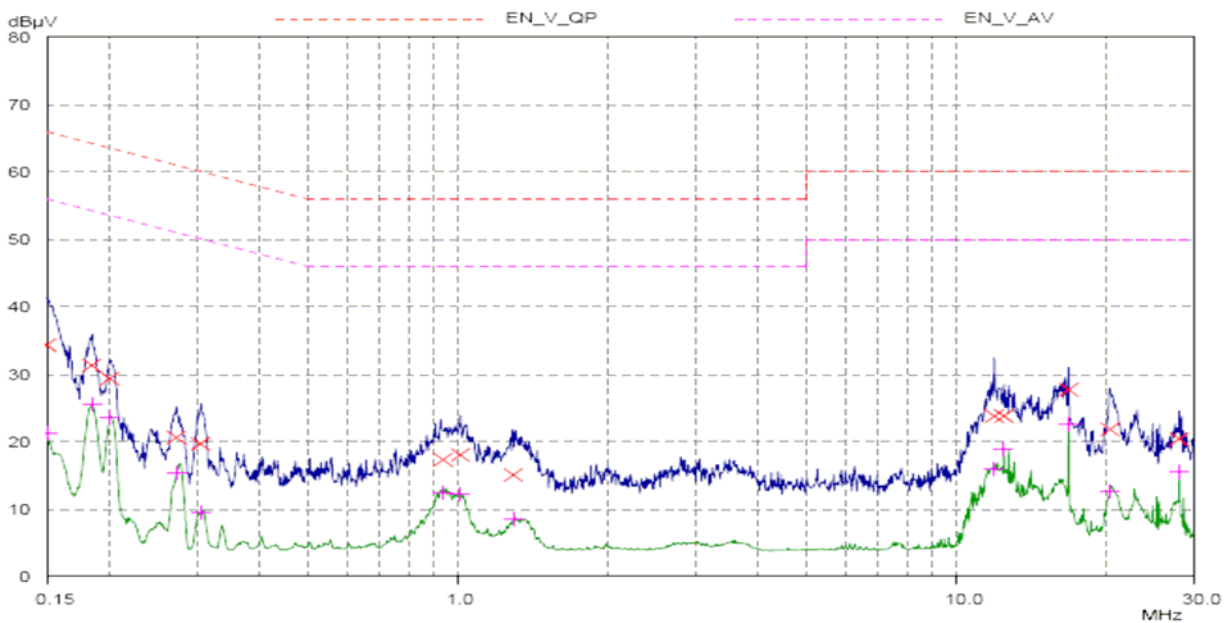
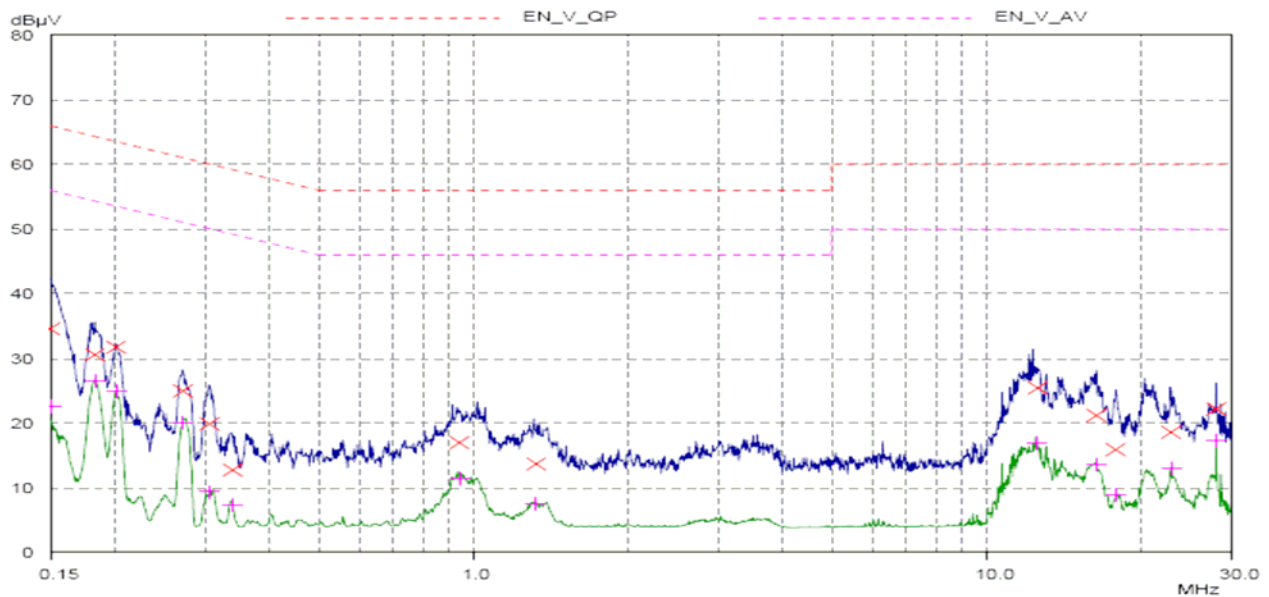


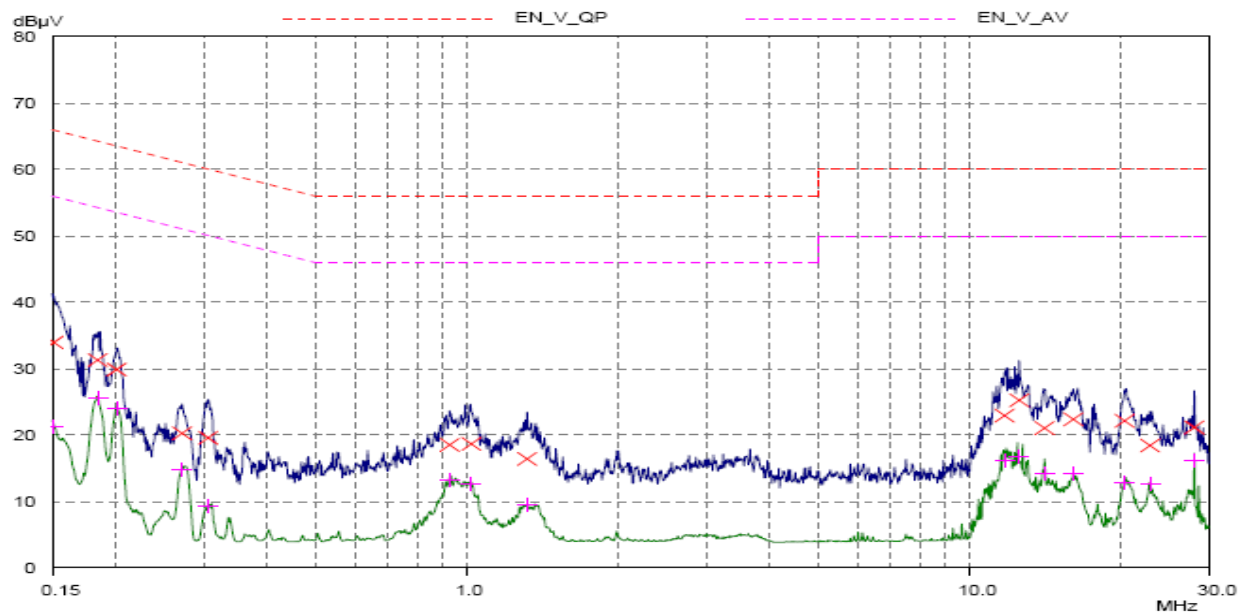
Figure 3. Graphical representation of conducted emissions

Operating condition: DVI Mode

Line Polarity: Hot



Line Polarity: Neutral



5. RADIATED EMISSION

	TEST: Limits for radiated disturbance				
Method	Measurements were made at Open area test site that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at 1, 2, 3 and 4 meter heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.		—		
Parameters required prior to the test		Laboratory Ambient Temperature	10 to 40 °C		
		Relative Humidity	10 to 90 %		
Parameters recorded during the test		Laboratory Ambient Temperature	1 °C		
		Relative Humidity	42 %		
		Frequency range	Measurement Point		
Fully configured sample scanned over the following frequency range		30 MHz – 1.0 GHz	(10 meter measurement distance)		
		1 GHz – 2.0GHz	(3 meter measurement distance)		
Limits - Class B					
Frequency (MHz)	Limit (dBµV/m)				
	Quasi-Peak		Results		
30 to 230	30		Pass		
230 to 1000	37		Pass		
1000 to 2000	54 (Average)		Pass		
Supplementary information: None					
Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Bilog antenna	Rohde & Schwarz	VULB9168	9168-230	2007.07. 05	2008.07. 05
Antenna mast	Dokin	5906	N/A	N/A	N/A
Antenna Turttable Controller	Dokin	5907	N/A	N/A	N/A
Amplifier	H.P	8447F	3113A05153	2007.07. 23	2008. 07. 23
EMI Receiver	Rohde & Schwarz	ESVS10	834468/008	2007.07. 24	2008. 07. 24

Figure 4. Photo of Radiated emission test setup

VGA and DVI Mode Front



VGA and DVI Mode Front



Table 3

Radiated emission Test data: VGA Mode

Test Frequency (MHz)	Meter Reading (dBuV)	Detector (Pk/QP)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (m)	Gain/Loss Factor (dB)	Transducer Factor (dB/m)	Level dBuV/m	Limit dBuV/m	Margin (dB)
36.59	40.5	QP	V	99	1.0	28.1	12.9	25.3	40.0	14.7
58.87	46.5	QP	V	110	1.0	28.1	14.5	32.9	40.0	7.2
168.85	46.0	QP	H	237	2.6	27.7	14.0	32.3	43.5	11.2
227.84	49.5	QP	H	90	1.8	27.4	10.6	32.7	46.0	13.3
253.89	53.0	QP	H	279	1.2	27.2	12.9	38.7	46.0	7.3
269.98	48.1	QP	H	264	1.2	27.2	12.9	33.8	46.0	12.2
321.00	44.5	QP	V	259	1.0	27.1	14.6	32.0	46.0	14.0
337.87	49.5	QP	V	14	1.0	27.1	14.6	37.0	46.0	9.0
421.85	43.7	QP	H	183	1.2	27.8	17.2	33.1	46.0	12.9
763.00	43.5	QP	H	105	1.0	28.4	24.6	39.7	46.0	6.3
956.40	36.1	QP	H	92	1.0	27.9	27.2	35.4	46.0	10.6
Supplementary information:										
This table is to be use when Gain/Loss and Transducer Factors are provided separately.										

Table 4

Radiated emission Test data: DVI Mode

Test Frequency (MHz)	Meter Reading (dBuV)	Detector (Pk/QP)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (m)	Gain/Loss Factor (dB)	Transducer Factor (dB/m)	Level dBuV/m	Limit dBuV/m	Margin (dB)
36.67	40.8	QP	V	109	1.0	28.1	12.9	25.6	40.0	14.4
58.97	45.7	QP	V	95	1.0	28.1	14.5	32.1	40.0	8.0
168.72	46.9	QP	H	374	2.4	27.7	14.0	33.2	43.5	10.3
227.98	50.1	QP	H	96	2.0	27.4	10.6	33.3	46.0	12.7
253.89	54.2	QP	H	267	1.3	27.2	12.9	39.9	46.0	6.1
270.00	49.1	QP	H	270	1.3	27.2	12.9	34.8	46.0	11.2
337.89	48.9	QP	V	35	1.0	27.1	14.6	36.4	46.0	9.6
421.95	44.1	QP	H	180	1.4	27.8	17.2	33.5	46.0	12.5
763.29	43.5	QP	H	99	1.0	28.4	24.6	39.7	46.0	6.3
956.87	36.0	QP	H	87	1.0	27.9	27.2	35.3	46.0	10.7
Supplementary information:										
This table is to be use when Gain/Loss and Transducer Factors are provided separately.										

Table 5

Radiated emission Test data: VGA Mode at 1GHz to 2GHz

Test Frequency (MHz)	Meter Reading (dBuV)	Detector (Pk/QP)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (m)	Gain/Loss Factor (dB)	Transducer Factor (dB/m)	Level dBuV/m	Limit dBuV/m	Margin (dB)
1014	80.38	PK	V	98	1.2	42.89	26.3	37.49	54	16.5
1510	81.95	PK	H	187	1.3	43.00	27.1	38.95	54	15.1
1585	81.51	PK	H	275	1.3	43.10	27.1	38.41	54	15.6

Supplementary information:

- This table is to be use when Gain/Loss and Transducer Factors are provided separately.
- Above 1 GHz, peak detector function mode is used using a resolution bandwidth of 1 MHz. The peak level complies with the average limit. Peak mode is used with linearly polarized horn antenna and low-loss microwave cable.

Table 6

Radiated emission Test data: DVI Mode at 1GHz to 2GHz

Test Frequency (MHz)	Meter Reading (dBuV)	Detector (Pk/QP)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (m)	Gain/Loss Factor (dB)	Transducer Factor (dB/m)	Level dBuV/m	Limit dBuV/m	Margin (dB)
1106	79.22	PK	V	171	1.2	42.89	26.3	36.33	54	17.67
1350	79.09	PK	V	13	1.2	42.90	26.8	36.19	54	17.81
1501	82.96	PK	V	246	1.3	43.00	27.1	39.96	54	14.04
1565	79.64	PK	H	259	1.3	43.10	27.1	36.54	54	17.46

Supplementary information:

- This table is to be use when Gain/Loss and Transducer Factors are provided separately.
- Above 1 GHz, peak detector function mode is used using a resolution bandwidth of 1 MHz. The peak level complies with the average limit. Peak mode is used with linearly polarized horn antenna and low-loss microwave cable.

Project Number: 08CA10346 File Number TC8312 Test Report No: 08CA10346-FCC
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7. Measurement Uncertainties

Test	Uncertainty
Radiated Emissions	± 4.6 dB
Conducted Emissions	± 3.92 dB