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Project:	12CA20126
File:	TC8312
Report:	12CA20126-CE
Date:	March 26, 2012
Model:	FS-L1903C

Electromagnetic Compatibility Test Report

For

LCD display

D&T Inc.
Daedeok Valley, 59-9, Jang Dong, Yuseong Gu, Daejeon, Korea, 305-343

Summary of Test Results:

The following tests were performed on a sample submitted for evaluation of compliance 47 CFR Part 15.107 (a) / 47 CFR 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	-	-
No modifications were made to the EUT in order to achieve and maintain compliance to the standards described in this report.				

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 test list was determined by the Applicant as being 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.

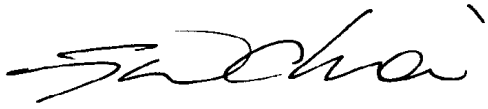
The equipment under test has

☐ Met the technical requirements

☒ Met the technical requirements under the limited condition

☐ Not met the technical requirements

Tested by
Sung Hoon Baek, Project Engineer
UL Verification Services- 3014ASEO
UL Korea Ltd.
Apr 30, 2012



Reviewed by
Jeawoon, Choi, Senior Project Engineer
UL Verification Services- 3014ASEO
UL Korea Ltd.
Apr 30, 2012

Test Report Details

Test report No:	12CA20126-CE
File No:	TC8312
Tests Performed By:	UL Korea Ltd. 33rd FL. GFC Bldg. 737 Yeoksam-dong, Kangnam-ku, Seoul, 135-984, Korea
Test Site:	CHUNGBUK TECHNOPARK 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. Daedeok Valley, 59-9, Jang Dong, Yuseong Gu, Daejeon, Korea, 305-343
Manufacturer:	D&T Inc. Daedeok Valley, 59-9, Jang Dong, Yuseong Gu, Daejeon, Korea, 305-343
Factory:	D&T Inc. Daedeok Valley, 59-9, Jang Dong, Yuseong Gu, Daejeon, Korea, 305-343
Applicant Contact:	Mr. Kyutae Park
Phone:	82-42-360-8000
E-mail:	ktpark@dntinc.co.kr
Product Type:	LCD display
Model Number:	FS-L1903C
Multilisting model number:	N/A The manufacturer has declared to all the multiple model names into the basic model without any further evaluation by UL.
Trademark:	N/A
Product standards:	FCC Part 15 Subpart B
Test Procedure:	ANSI C63.4 : 2003
Sample Serial Number:	N/A
Sample Receive Date:	Apr 06, 2012
Testing Start Date:	Apr 13, 2012
Date Testing Complete:	Apr 18, 2012
Test Report Date:	Apr 27, 2012
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.

REPORT DIRECTORY

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1. GENERAL PRODUCT DESCRIPTION

1.1 Equipment Description:

Description:
FS-L1903C product has been designed to use X-ray inspection solution.

1.2 Details of Equipment Under Test (EUT):

Equipment Configuration:				
No.	Product Type	Manufacturer	Model	Comments
1	LCD Display	D&T Inc.	FS-L1903C	N/A
2	D-SUB Cable	N/A	N/A	N/A
4	DVI Cable	N/A	N/A	N/A

1.3 Technical Data:

Specification		
Item		Description
LCD Panel	Description	DLM190-A01
	Resolution	1280 x 1024 pixels.
Scalar		PW338x
Input Signal		1 x DVI 1 x D-SUB 1 x RS-232
User Controls		8 Buttons OSD control
Output Signal		None
Power Supply		SMPS (24V , 4.2A)
Board Dimension		Main : 155 x 140 (mm) LED Driver : 105 x 60 (mm)
Unit Dimension		426.5 x 357.0 x 73.5 (mm)
Panel		
Description		DLM190-A01
Size		19” Diagonal
Number of Pixels		1280 x 1024
Number of Colors		16.7M

1.4 EUT Internal operating Frequency

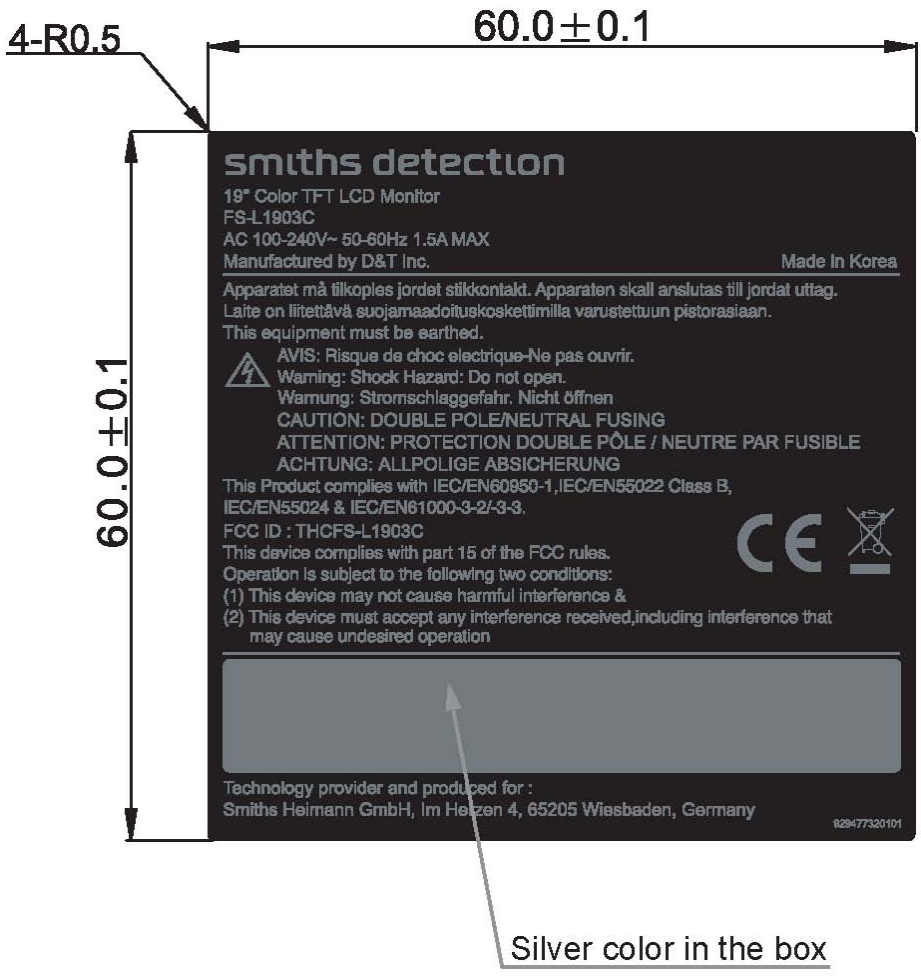
Frequency (MHz)	Description	Frequency (MHz)	Description
27.00 MHz	System Clock	28.322 MHz	System Clock
107.5 MHz	Display Clock	-	-

1.5 Technical descriptions and documents:

No.	Document Title and Description
1	FS-L1903C User Manual
***Note:** The manufacturer provided the following document.	

1.6 Equipment Marking Plate of Product:

Product Label



2. TEST CONDITION

2.1 Equipment Used During Test:

Use*	Product Type	Manufacturer	Model	Comments
EUT	LCD Display	D& T Inc.	FS-L1903C	-
AE	PC	DELL	OPTIPLEX 760	Used for DVI, D-sub
AE	USB mouse	DELL	M-UAR DEL7	-
AE	USB Keyboard	DELL	SK8175	-
AE	Headset	ACTTO	-	-
AE	Printer	SAMSUNG	ML-2250G	-
***Note: EUT** - Equipment Under Test, **AE** - Auxiliary/Associated Equipment, **SIM** - Simulator (Not Subjected to Test)				

2.2 Input/Output Ports:

Port #	Name	Type*	Cable Max. >3m	Cable Shielded	Comments
1	Mains	AC	1.8 m	Unshielded	Hospital-grade AC Power cord
2	DVI In	I/O	1.8 m	Shielded	19 pin DVI-D
3	VGA In	I/O	1.8 m	Shielded	15 pin D-Sub
***Note 1:** the manufacturer provided the specification of Cable length. ***Note 2:** *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.					

2.3 Power Interface:

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Comments
Rated	115-230Vac	-	-	47-63	-
1	120Vac	-	-	50	-

2.4 Test Operating Mode:

Mode #	Test Item	Comments
1	DVI In Mode	-
2	VGA (D-SUB) Mode	Worst case condition

Note:
1. All the configuration described above has been investigated during the preliminary testing and selected as worst-case condition for final measurements.
2. EUT has been performed under continuous displaying "H" Patten for configuration modes of 1 and 2.

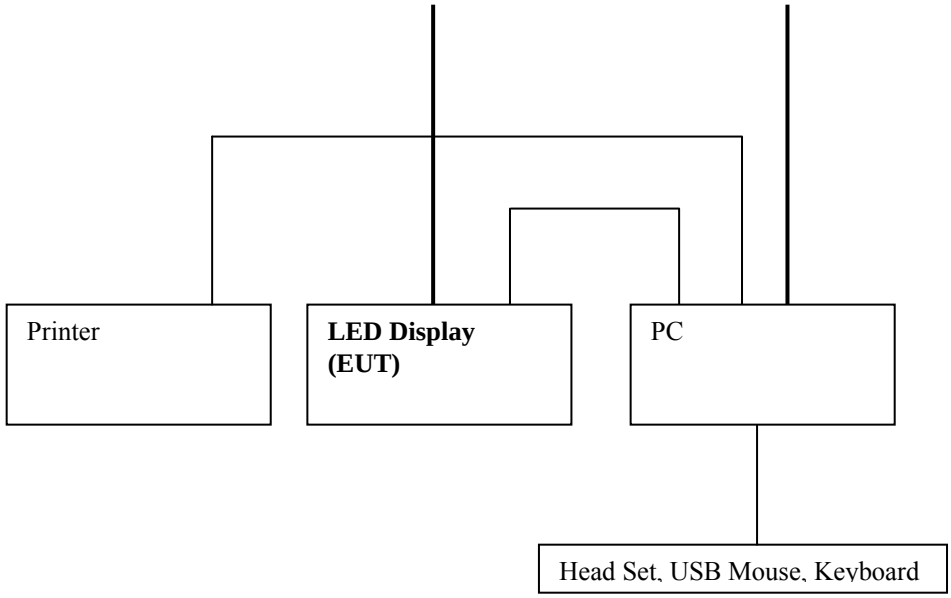
2.5 Modes of Video resolution:

Mode #		Resolution	Comments
1	D-sub Mode	1280 * 1024 @ 60Hz	-
2		1280 * 1024 @ 75Hz	-
3		1280 * 1024 @ 85Hz	Worst case condition (Range of Brightness: 100, Range of contrast: 100 And range of backlight: 100

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

2.6 Configuration:

Test configuration



3. TEST CONDITION AND RESULTS

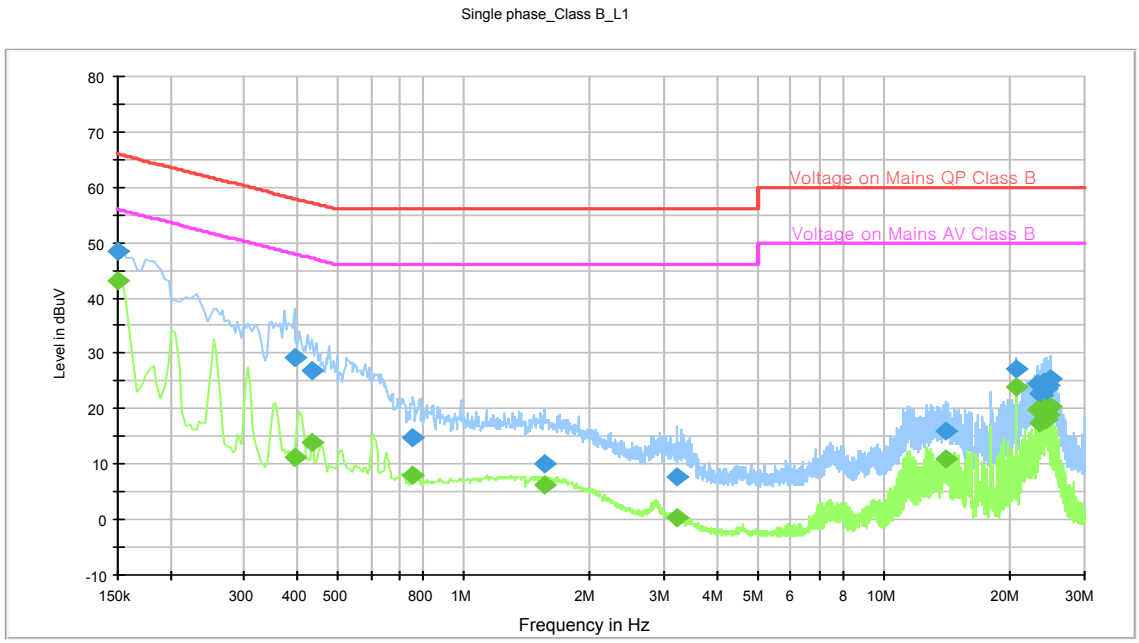
3.1 MAINS TERMINAL DISTURBANCE VOLTAGE TEST

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.				
Basic Standard		FCC Part 15			
Parameters recorded during the test		Laboratory Ambient Temperature	20.3 °C		
		Relative Humidity	38.0 %		
-		Frequency range on each side of line	Measurement Point		
Fully configured sample scanned over the following frequency range		150 kHz to 30 MHz	AC Input port of EUT		
Limits - Class B					
Frequency (MHz)	Limit (dBμV)				
	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 2.3)		EUT Operation Mode # (See 2.4)		EUT Configurations Mode # (See Section 2.6)	
1		2		1	

Conducted Emissions Test Equipment used:					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Test Receiver	Rohde & Schwarz	ESPI	101088	2011.05.26	2012.05.26
LISN	Rohde & Schwarz	ESH2-Z5	100146	2011.05.27	2012.05.27
LISN	Schwarzbeck	NNLK8129	8129162	2011.05.27	2012.05.27
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	3057.8810.54	2011.05.27	2012.05.27

Figure 1. Graphical representation of conducted emissions

Hot Line



Neutral Line

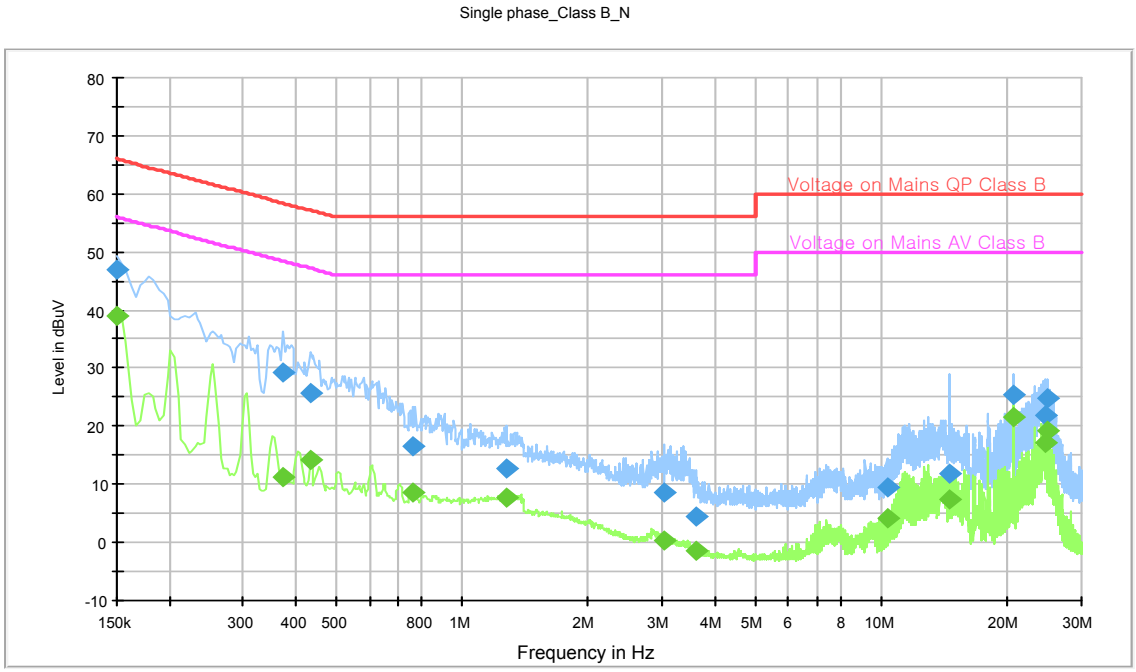


Table 1. Test data for conducted emission, D-Sub Mode

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
0.150	9.88	0.12	38.6	33.1	L1	48.6	43.1	66.0	56.0	17.4	12.9
0.374	9.86	0.14	19.1	1.2	N	29.1	11.2	58.0	48.0	29.3	37.2
0.394	9.86	0.14	19.3	1.2	L1	29.3	11.2	58.0	48.0	28.7	36.8
0.434	9.86	0.14	17.0	4.0	L1	27.0	14.0	57.0	47.0	30.2	33.2
20.590	10.19	0.91	16.0	12.9	L1	27.1	24.0	60.0	50.0	32.9	26
20.594	9.89	0.91	14.6	10.9	N	25.4	21.7	60.0	50.0	34.6	28.3
23.966	10.34	0.86	13.7	8.9	L1	24.9	20.1	60.0	50.0	35.1	29.9
24.250	10.34	0.86	12.4	6.9	L1	23.6	18.1	60.0	50.0	36.4	31.9
24.826	10.35	0.85	14.2	9.1	L1	25.4	20.3	60.0	50.0	34.6	29.7
24.830	9.95	0.85	14.0	8.3	N	24.8	19.1	60.0	50.0	35.2	30.9

***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.

3.2 RADIATED DISTURBANCE

TEST: Limits for radiated disturbance					
Method	Frequency scans were conducted with a peak detector with horizontal and vertical polarization of the antenna. Measurements were done in the frequency range 30-1000 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.				
Basic Standards	FCC Part 15				
Parameters recorded during the test	Laboratory Ambient Temperature	21.2 °C			
	Relative Humidity	39.0 %			
-	Frequency range	Measurement Point			
Fully configured sample scanned over the following frequency range	30 MHz – 2.0 GHz	3 meter measurement distance			
Limits – Class B					
Frequency (MHz)	Limit (dBµV/m)				
	Quasi-Peak		**Results**		
30 to 88	40.00		**Pass**		
88 to 216	43.50		**Pass**		
216 to 960	46.00				
-	Average	Peak	-		
Above 960	54	74	**Pass**		
EUT Configuration Settings:					
Power Interface Mode # (See Section 2.3)	EUT Operation Mode # (See 2.4)	EUT Configurations Mode # (See Section 2.6)			
1	2	1			
Radiated Emissions Test Equipment:					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Test Receiver	Rohde & Schwarz	ESIB26	100359	2011.05.28	2012.05.28
BiconiLog ANT	Schaffner	CBL6112D	22022	2011.10.07	2012.10.07
Horn Antenna	SCHWARZBECK	BBHA9120D	147	2011.04.13	2012.04.13
Amplifier (1~18GHz)	MITEQ	AFS42-00101800-25-S-42	151221	2011.04.13	2012.04.13

Figure 2. Graphical representation, 30 MHz to 1000 MHz

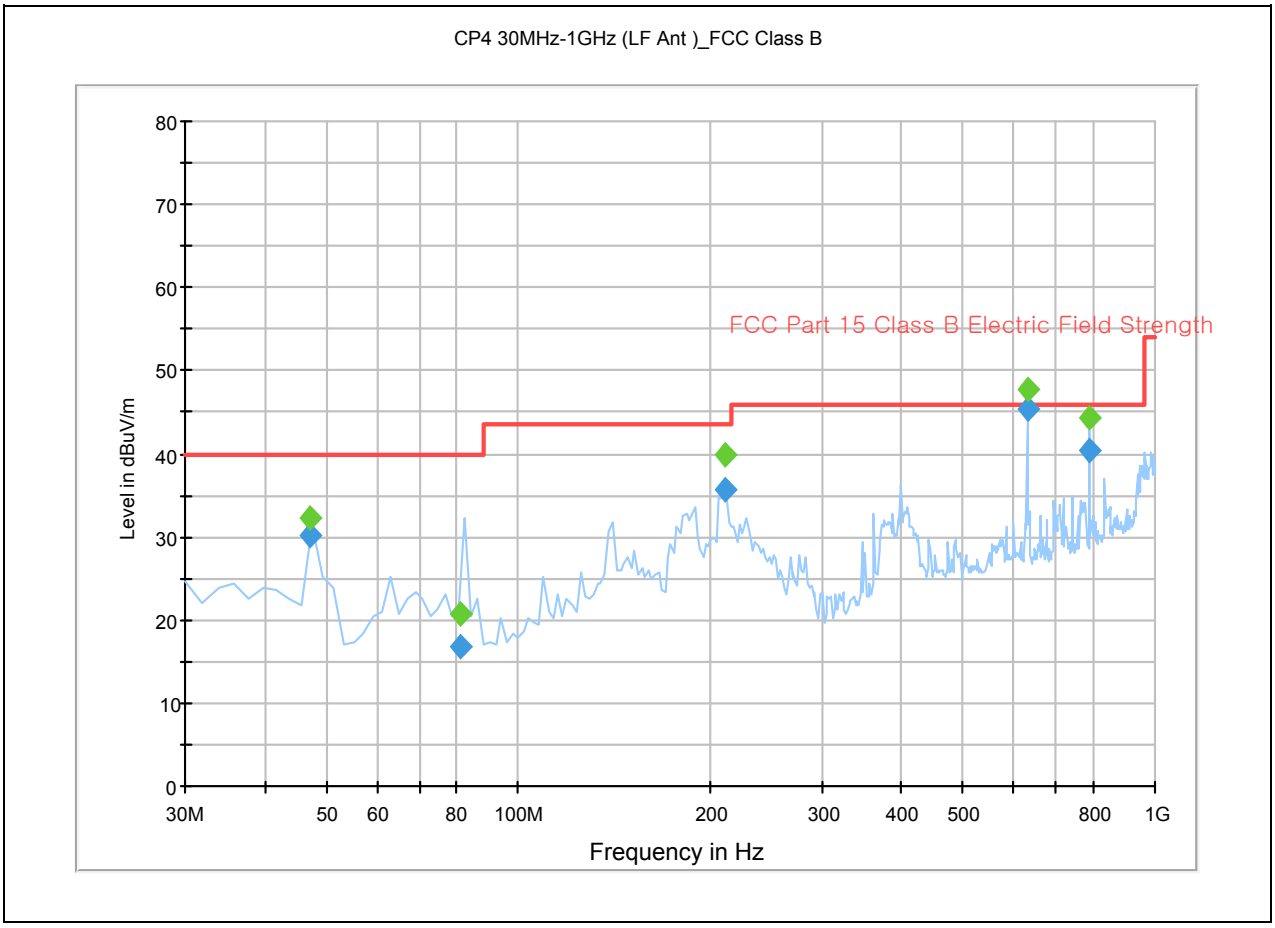


Table 2. Radiated emission Test data

Test Frequency (MHz)	Meter Reading (dBuV)	Detector (Pk/QP)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (m)	Cable Loss Factor (dB)	Antenna Factor (dB/m)	Level dBuV/m	Limit dBuV/m	Margin (dB)
47.24	19.70	QP	V	183.00	1.00	1.58	8.82	30.10	40.00	9.90
81.04	7.40	QP	V	297.00	1.95	1.92	7.38	16.70	40.00	23.30
211.98	22.80	QP	H	0.00	1.05	1.67	11.13	35.60	43.50	7.90
630.05	22.40	QP	V	344.00	1.05	4.91	18.19	45.50	46.00	0.50
787.57	15.90	QP	H	14.00	1.95	5.96	18.64	40.50	46.00	5.50
47.24	19.70	QP	V	183.00	1.00	1.58	8.82	30.10	40.00	9.90
81.04	7.40	QP	V	297.00	1.95	1.92	7.38	16.70	40.00	23.30

Figure 3. Graphical representation, 1.0 GHz to 2.0 GHz

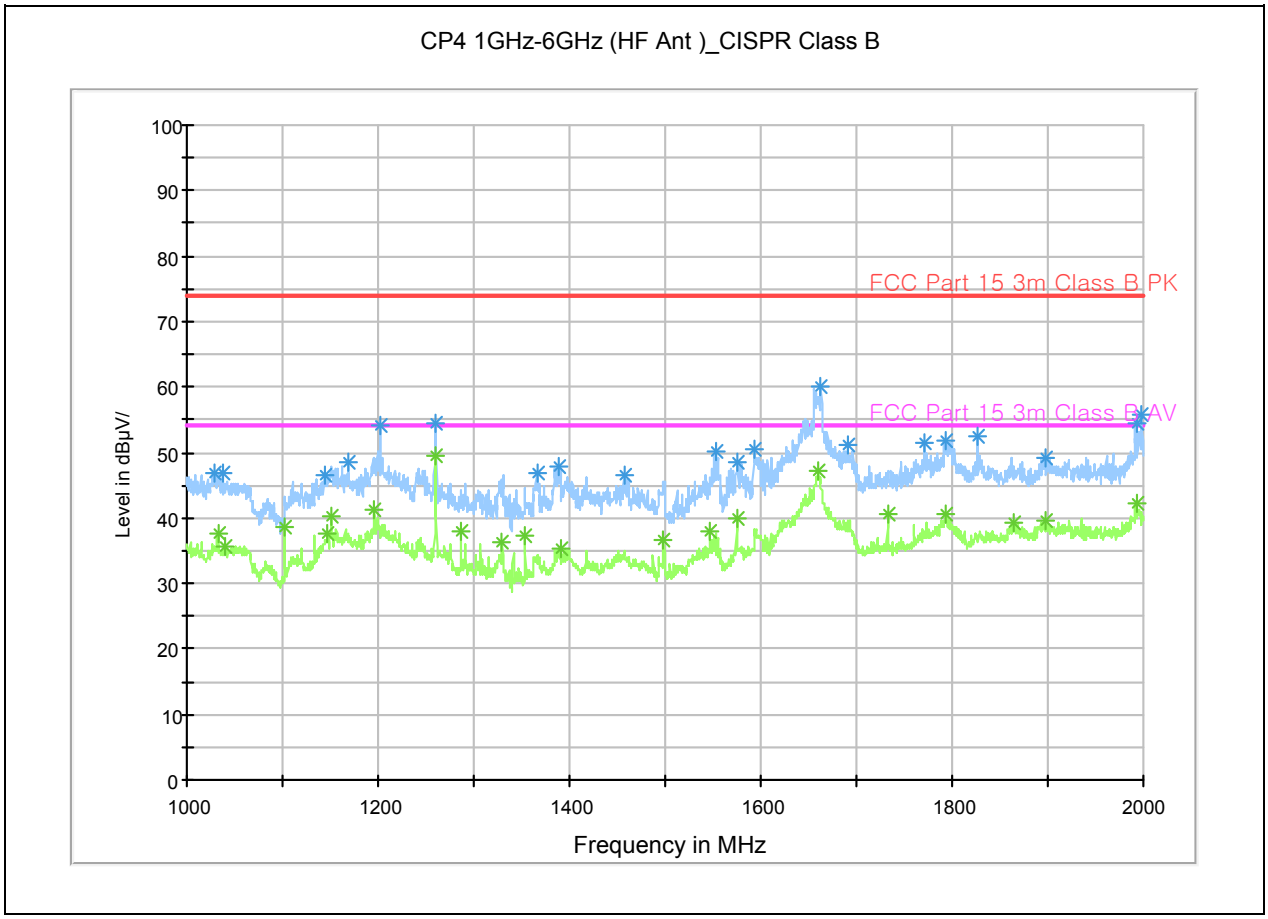


Table 3. Radiated emission Test data, D-Sub Mode, 1.0 GHz to 2.0 GHz

Frequency (MHz)	Correction Factor			Antenna Height (m)	Peak					Average				
	Antenna (dB/m)	Amp (dB)	Cable (dB)		Polarity	Limit (dBuV/m)	Reading (dBuV)	Result (dBuV)	Margin (dB)	Polarity	Limit (dBuV/m)	Reading (dBuV)	Result (dBuV)	Margin (dB)
1168.8	25.23	24.23	5.51	1.00	V	74.00	41.90	48.40	25.60	V	54.00	30.80	37.30	16.70
1201.6	25.26	24.20	5.43	1.00	V	74.00	47.70	54.20	19.80	V	54.00	31.80	38.30	15.70
1388.8	25.48	24.20	5.92	1.50	V	74.00	40.60	47.80	26.20	V	54.00	27.30	34.50	19.50
1594	25.72	24.02	6.50	1.00	V	74.00	42.40	50.60	23.40	V	54.00	29.40	37.60	16.40
1663.2	25.80	24.07	6.97	1.00	V	74.00	51.40	60.10	13.90	V	54.00	35.70	44.40	9.60
1827.2	25.99	24.56	7.37	1.00	V	74.00	43.80	52.60	21.40	V	54.00	28.20	37.00	17.00
1993.2	26.18	24.26	7.57	1.00	V	74.00	45.10	54.60	19.40	V	54.00	32.80	42.30	11.70
1998	26.19	24.26	7.67	1.00	V	74.00	46.10	55.70	18.30	V	54.00	29.90	39.50	14.50