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Project: 11CA21120  
File: TC8389  
Report 11CA21120-FCC  
Date: September 15, 2011  
Model: FireCR (Basic) and VetCR

## **FCC Certification Report**

### **For**

## **Computed Radiography Scanner**

**3D Imaging & Simulations Corp.  
815, Tamnip-Dong, YUSEONG-GU, Daejeon, Korea**

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A not-for-profit organization dedicated  
to public safety and committed to  
quality service for over 100 years

Project Number:	11CAC21120	File Number	TC8389	Test Report No: 11CAC21120-FCC
Model Number:	FireCR			Date of Issue: September 26, 2011
Client Name	3D Imaging & Simulations Corp.			

### Test Report Details

Test report No: 11CA21120-FCC  
File No: TC8389  
Tests Performed By: UL Korea Ltd.  
33<sup>rd</sup> FL. Gangnam Finance Center, 737 Yeoksam-dong,  
Kangnam-ku, Seoul, 135-984, Korea  
Test site: Digital EMC Co., Ltd.  
683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Kyunggi-Do, Korea, 449-080  
The test facility was deemed to have the environment and capabilities  
necessary to perform the tests included in the test package  
Applicant: 3D Imaging & Simulation Corp.  
815, Tamnip-Dong, YUSEONG-GU, Daejeon, Korea  
Manufacturer: 3D Imaging & Simulation Corp.  
815, Tamnip-Dong, YUSEONG-GU, Daejeon, Korea  
Factory: 3D Imaging & Simulation Corp.  
815, Tamnip-Dong, YUSEONG-GU, Daejeon, Korea  
Applicant Contact: Jungkook, Kim  
Title: General Manager  
Phone: +82-42-931-2100  
E-mail: [jkim@3-disc.com](mailto:jkim@3-disc.com)  
Product Type: Computed Radiography Scanner  
Trademark:   
3DISC  
3D Imaging & Simulations  
Model Number: FireCR (Basic) , VetCR  
FCC ID: X68CRSCANNER1  
Product standards FCC Part 15 Subpart B Class B  
Test Procedure ANSI C63.4 : 2003  
Sample Serial Number: None (Proto type)  
Sample Receive Date: July 4, 2011  
Testing Start Date: July 4, 2011  
Date Testing Complete: September 16, 2011  
**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.

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**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 and ICES-003, Class B digital Apparatus.

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

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, Project Engineer  
Conformity Assessment Services - 3014ASEO  
UL Korea Ltd.  
September 26, 2011



Reviewed by  
Jeawoon, Choi, Senior Project Engineer  
Conformity Assessment Services – 3014ASEO  
UL Korea Ltd.  
September 26, 2011

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## REPORT DIRECTORY

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## 1. EQUIPMENT UNDER TEST (EUT)

### 1.1 Report Revision history

Revision Date	Description	Remarks	Revision reviewed By
-	Original	-	-

### 1.2 Equipment Description

Description:	
This device is a Computed Radiography System and intended for use in producing digital X-Ray images for general radiography purposes. It comprises of scanner, two kinds of cassettes with reusable imaging plate and workstation software. It scans X-Ray exposed image plate and produces X-Ray image in digital form. Then, digital image is transferred to workstation for further processing and routing. This device distinguishes the size of cassettes, the scan speed of scanner and whether the function of DICOM print is used or not from RFID tags.	

### 1.3 Details of Test Equipment (EUT)

Equipment Configuration:				
No.	Product Type	Manufacturer	Model	Comments
1	Computed Radiography Scanner	3D Imaging & Simulation Corp.	FireCR (Basic)	VetCR (Model Number multiple)
2	AC to DC Adapter	Bridge Power corp.	BPM150S24F06	-

#### 1.4 Equipment Specification

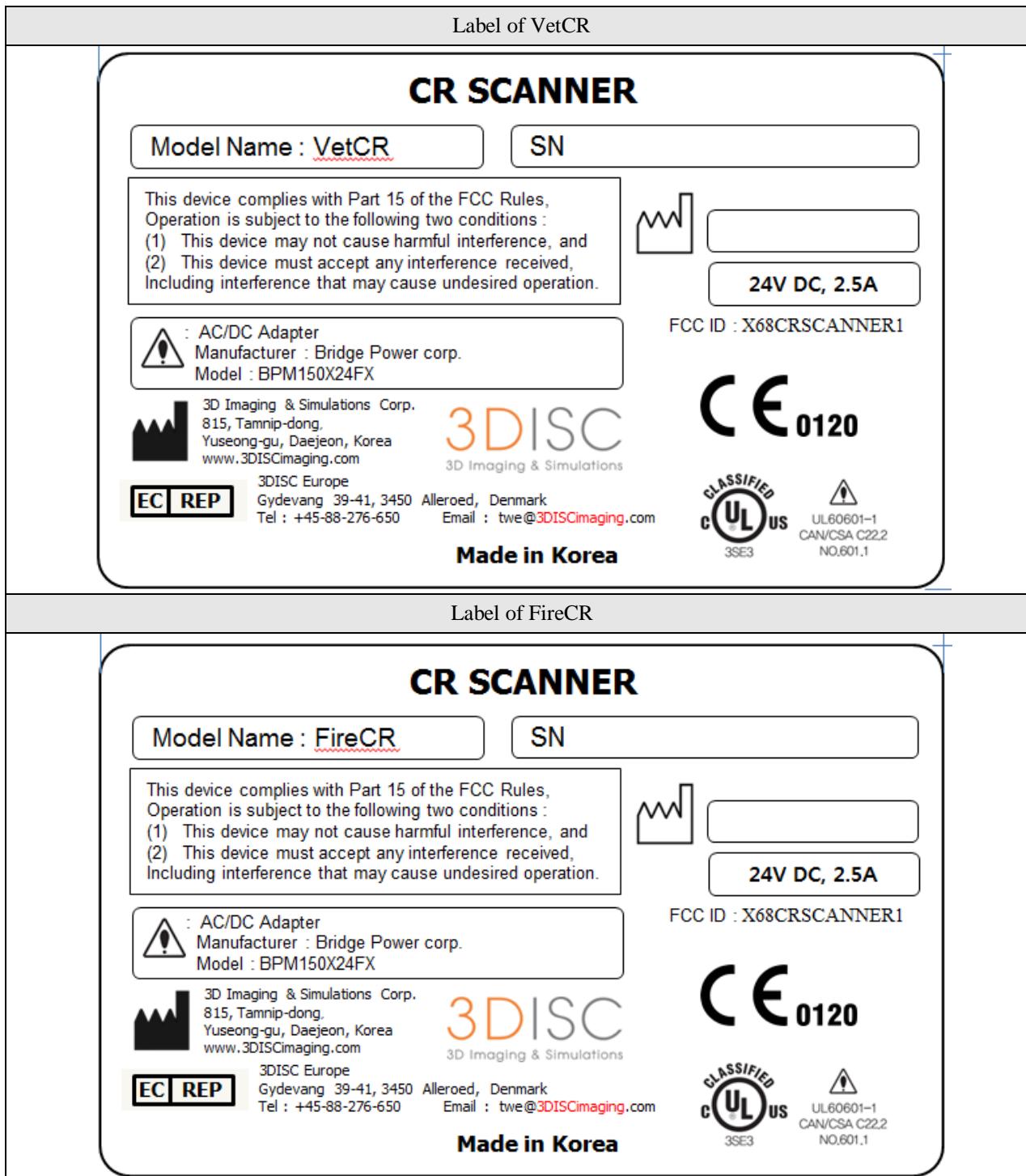
Specifications		
Sampling Pixel Pitch	Standard	200um
	High	100um
Pixel Matrix	Standard	1750 x 2150
	High	3500 x 4300
Scanning Time	Standard	19 sec
	High	38 sec
Accepted Cassette Size	14 " x 17"	
Gray Scale Resolution	16 bit	
Eraser	Embedded	
Erasing Time	30 sec (User Settable)	
Scanning & Erasing Cycle Time	Standard	49 sec
	High	78 sec
Computer Interface	USB 2.0	
Dimensions	120 (H) x 460 (W) x 703 (D) mm 4.8 (H) x 18.3 (W) x 27.7 (D) inch	
Weight	30kg (65lbs)	
Power Requirement	100 ~ 240V / 50 ~ 60Hz	
System Configuration	Tabletop	
Application Software	Included	
Image File Format	DICOM 3.0	

#### 1.5 Technical descriptions and documents:

No.	Document Title and Description
1	FireCR User Manual and specification
<b>Note:</b> The manufacturer provided the following document.	

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## 1.6 Equipment Marking Plate



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### 1.7 Equipment Used During Test

Use*	Product Type	Manufacturer	Model	Comments
EUT	Computed Radiography Scanner	3D Imaging & Simulation Corp.	FireCR	-
EUT	A.C. to D.C. Adapter	Bridge Power corp.	BPM150S24F06	-
AE	Notebook	LG	LGT28	SN: 003QTAF063488
AE	AC/DC Adapter	Delta electronics Inc	ADP-65JHAB	SN: 672W02R03EL
AE	Headset	COSY	COV93	-
AE	Mouse	rogitech Inc	M-UAE96	-
AE	Keyboard	Dell Inc	SK-8115	-

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

### 1.8 EUT Input/Output Ports

Port #	Name	Type*	Cable Max. >3m	Cable Shielded	Comments
1	Mains	AC	1.8m	Unshielded	Mains of Adapter
2	USB	I/O	1.5m	Shielded	Connected with PC

**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

### 1.9 EUT Internal Operating Frequencies

Frequency (MHz)	Description	Frequency (MHz)	Description
50.00 MHz	System reference Clock	83.00 MHz	System Clock
83.00 MHz	Memory Clock	13.56MHz	RFID frequency

### 1.10 Power Interface

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Comments
Rated	100-240Vac	2.5A	-	50-60Hz	Rated of A.C. to D.C. Adapter
1	120 V	-	-	60 Hz	-

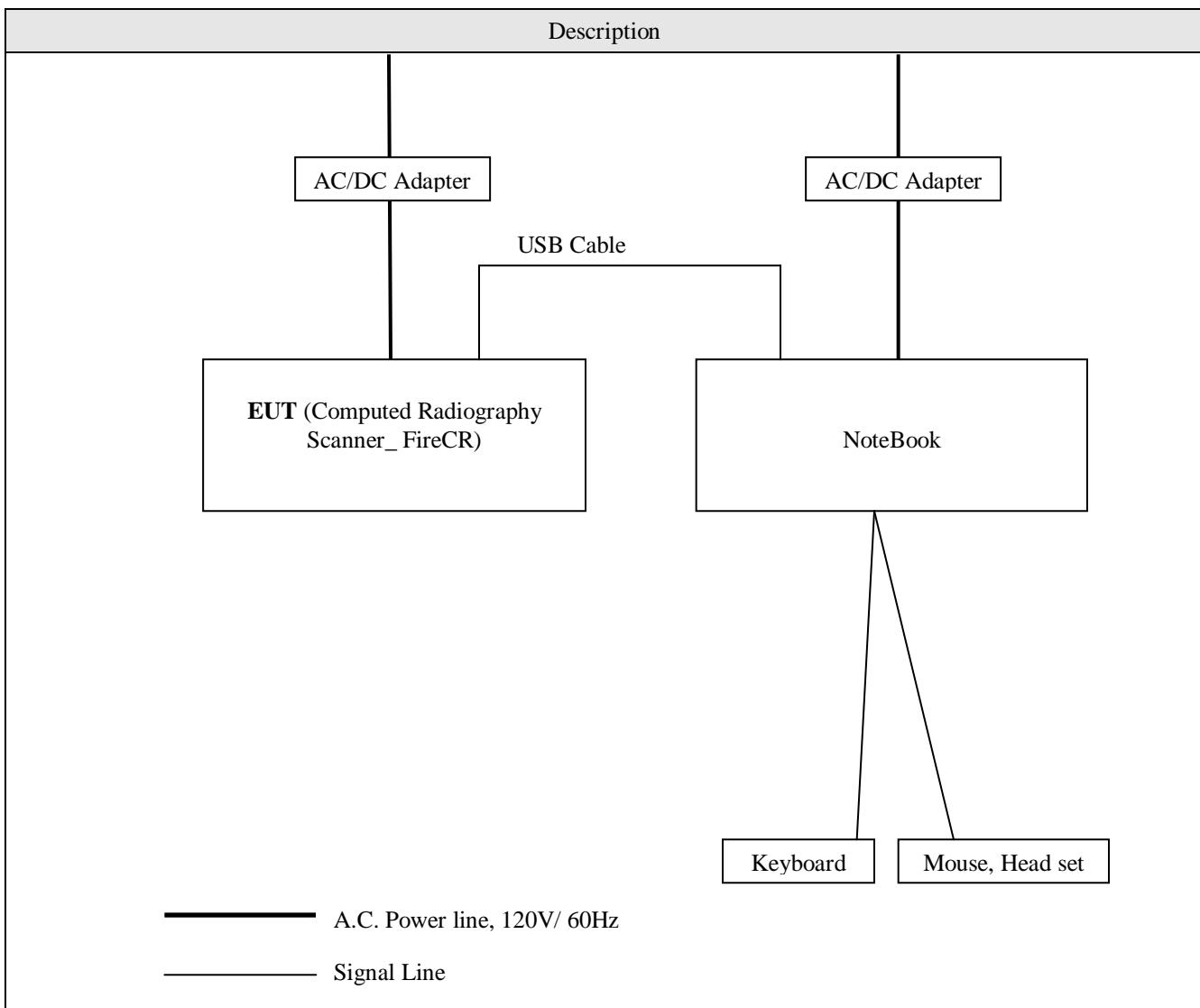
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## 2.0 TEST CONDITION

### 2.1 Test mode

Mode #	Description
1	The measurement has been performed in the representative operation mode Computed Radiography Scanner (EUT) was powered by A.C. to D.C. adapter and Computed Radiography Scanner (EUT) has been performed under continuous scanning and the image in the memory of the Computed Radiography Scanner (EUT) is sending to the PC by using the software through the USB cable. RFID function has been tested in the continuous mode of data transmission.

### 2.2 Test configuration



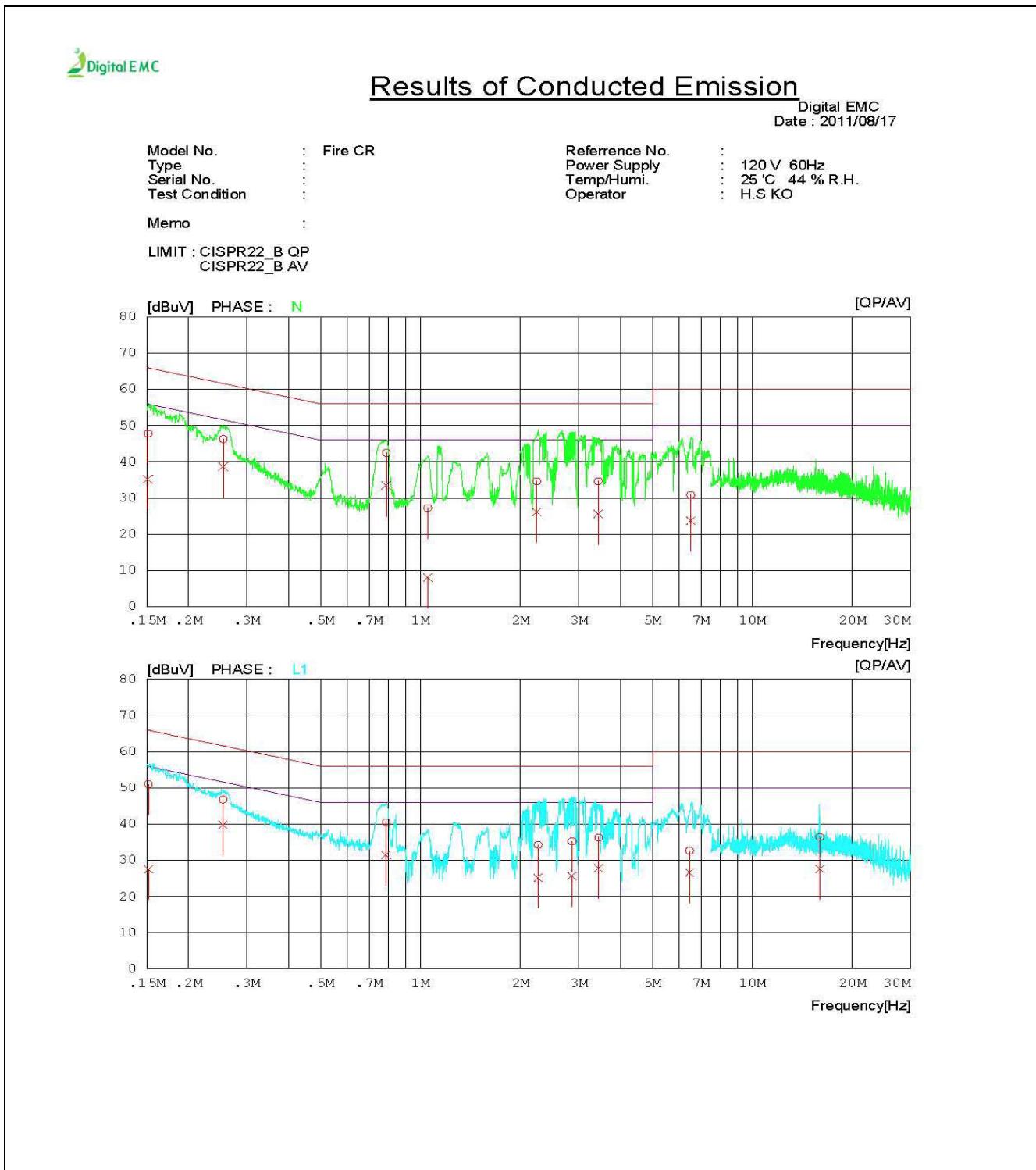
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### 3.0 A.C. POWER LINE CONDUCTED EMISSION TEST

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		16 °C			
	Relative Humidity		40 %			
-	Frequency range on each side of line		Measurement Point			
Fully configured sample scanned over the following frequency range	150 kHz to 30 MHz		A.C. power ports of A.C. to D.C. Adapter			
Limits – Class B						
Frequency (MHz)	Limit (dB $\mu$ V)					
	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		
Conducted Emissions EUT Configuration Settings						
Power Interface Mode # (See Section 1.10)		EUT Operation Mode # (See Section 2.1)		EUT Configurations Mode # (See Section 2.2)		
1		1		1		
Test Equipment Used						
Description	Manufacturer	Model	Identifier	Cal. Due		
EMI Test Receiver	R&S	ESCI	100364	2012.03.08		
LISN	R&S	ESH2-Z5	828739/006	2012.10.01		

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**Figure 2. Graphical representation**



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**Table 1. Test data for conducted emission**

<u>Results of Conducted Emission</u>																		
Digital EMC Date : 2011/08/17																		
Model No. : Fire CR			Reference No.															
Type							Power Supply	: 120 V 60Hz										
Serial No.							Temp/Humi.	: 25°C 44 % R.H.										
Test Condition							Operator	: H.S KO										
Memo																		
LIMIT : CISPR22_B QP CISPR22_B AV																		
NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C. FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE							
1	0.15111	47.7	35.1	0.1	47.8	35.2	65.9	55.9	18.1	20.7	N							
2	0.25443	46.2	38.5	0.1	46.3	38.6	61.6	51.6	15.3	13.0	N							
3	0.78850	42.3	33.2	0.2	42.5	33.4	56.0	46.0	13.5	12.6	N							
4	1.05150	27.0	7.8	0.2	27.2	8.0	56.0	46.0	28.8	38.0	N							
5	2.23900	34.5	26.0	0.1	34.6	26.1	56.0	46.0	21.4	19.9	N							
6	3.43100	34.4	25.4	0.2	34.6	25.6	56.0	46.0	21.4	20.4	N							
7	6.51300	30.5	23.4	0.3	30.8	23.7	60.0	50.0	29.2	26.3	N							
8	0.15150	50.9	27.5	0.1	51.0	27.6	65.9	55.9	14.9	28.3	L1							
9	0.25396	46.7	39.7	0.1	46.8	39.8	61.6	51.6	14.8	11.8	L1							
10	0.78780	40.3	31.3	0.2	40.5	31.5	56.0	46.0	15.5	14.5	L1							
11	2.26000	34.1	25.1	0.1	34.2	25.2	56.0	46.0	21.8	20.8	L1							
12	2.85900	35.1	25.6	0.1	35.2	25.7	56.0	46.0	20.8	20.3	L1							
13	3.44150	36.1	27.6	0.2	36.3	27.8	56.0	46.0	19.7	18.2	L1							
14	6.47000	32.3	26.3	0.3	32.6	26.6	60.0	50.0	27.4	23.4	L1							
15	15.96300	36.2	27.4	0.2	36.4	27.6	60.0	50.0	23.6	22.4	L1							

**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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#### 4.0 RADIATED EMISSION TEST

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 recorded during the test		Laboratory Ambient Temperature	17°C	
		Relative Humidity	38%	
-		Frequency range	Measurement Point	
Fully configured sample scanned over the following frequency range		30 MHz – 1.0 GHz	3 meter measurement distance	
Limits - Class B				
Frequency (MHz)	Limit (dB $\mu$ V/m)		Results	
30 to 88	40		Pass	
88 to 216	43.5		Pass	
216 to 960	46		Pass	
Above 960	54		Pass	
Radiated Emissions EUT Configuration Settings				
Power Interface Mode # (See Section 1.10)	EUT Operation Mode # (See Section 2.1)		EUT Configurations Mode # (See Section 2.2)	
1	1		1	
Test Equipment Used				
Description	Manufacturer	Model	Identifier	Cal. Due
EMI Test Receiver	R&S	ESU	100014	2012.01.20
Bilog Antenna	SCHAFFNER	CBL6112B	2737	2012.07.14
Amplifier	HP	8447E	2945A02865	2012.01.11
Controller	TOKIN	5905A	N/A	-

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**Figure 4. Graphical representation**



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**Table 2. Radiated emission Test data**

<b><u>RADIATED EMISSION</u></b>																								
Date : 2011-07-19																								
Model Name	:	FIRECR			Reference No.																			
Model No.	:				Power Supply																			
Serial No.	:				Temp/Humi																			
Test Condition	:				Operator																			
Memo	:																							
LIMIT : FCC Part15 Subpart.B Class B (3m)																								
MARGIN: 3 dB																								
No.	FREQ [MHz]	READING [dBuV]	ANT QF FACTOR	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]														
----- Horizontal -----																								
1	150.100	45.3	10.4	1.7	23.1	34.3	43.5	9.2	300	236														
2	162.740	49.9	10.2	1.8	23.1	38.8	43.5	4.7	300	33														
3	230.550	44.6	11.7	2.2	23.4	35.1	46.0	10.9	100	195														
4	480.010	48.1	17.3	3.3	24.6	44.1	46.0	1.9	201	114														
----- Vertical -----																								
5	53.000	43.9	8.2	1.0	22.6	30.5	40.0	9.5	100	192														
6	69.000	49.1	6.3	1.2	22.6	34.0	40.0	6.0	100	125														
7	147.000	43.0	10.6	1.7	23.1	32.2	43.5	11.3	100	225														
8	162.750	43.9	10.2	1.8	23.1	32.8	43.5	10.7	299	258														
9	480.000	43.1	17.3	3.3	24.6	39.1	46.0	6.9	199	182														

Supplementary information:

- The correction value has been included the Emission level measured value with offset
- Correction = Cable loss + Antenna Factor

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## 5.0 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]
Above 1 GHz	3 m: ±3.73 [dBuV/m]

## 6.0 ACCREDITATIONS AND AUTHORIZATIONS

Digital EMC Co., Ltd. has been accredited / filed / authorized by the agencies listed in the following table;

Certificate	Nation	Agency	Code	Mark
Accreditation	Korea	KOLAS	393	ISO/IEC 17025
Site Filing	USA	FCC	101842	Test Facility list & NSA Data
	Japan	VCCI	C-1427 R-1364, R-3385 T-1442, G-338	Test Facility list & NSA Data
Certification	Korea	KC	KR0034	Test Facility list & NSA Data
	Germany	TUV	ROK1028C	ISO/IEC 17025

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competent of calibration and testing laboratory”.