



Underwriters Laboratories Inc.

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Order: 11070973

Report: 16-11070973-FCC

Date: January 15, 2016

Model: 240-031-050

Multi Model: 240031050, 0240031050, 0-
240-031-050, 0240-031-050,
240.031.050, 0240.031.050,
0.240.031.050,
32" 4K Surgical Display,
AMM320ES

FCC ID: QVXAMM320ES

Electromagnetic Compatibility Test Report

For

LCD Color Medical Monitor

**ADVAN INT'L CORP
47817 Fremont Blvd. Fremont CA 94538 U.S.A.**

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



Witness tested by
Jihoon Lee, WiSE Laboratory Engineer
Consumer Technology Division
UL Korea Ltd.
January 15, 2016



Reviewed by
Jeonghwan Kim, WiSE Laboratory Engineer
Consumer Technology Division
UL Korea Ltd.
January 15, 2016

Test Report Details

Test report No: 16-11070973-FCC

Witnessed By: UL Korea Ltd.
26th FL. GFC Bldg. 737 Yeoksam-dong, Kangnam-ku, Seoul, 135-984, Korea

Test Site: KCTL Inc.
65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-390, Korea
The test facility was deemed to have the environment and capabilities necessary to perform the tests included in the test package.

Applicant: ADVAN INT'L CORP
47817 Fremont Blvd. Fremont CA 94538 U.S.A.

Manufacturer: ADVAN INT'L CORP
47817 Fremont Blvd. Fremont CA 94538 U.S.A.

Factory: D&T Inc.
(JANG-DONG, (DAEDEOK VALLEY))
26-121 GAJEONGBUK-RO, YUSEONG-GU, DAEJEON 305-343, KOREA

Applicant Contact: Jun Ho Jang

Phone: 82-70-7842-8018

E-mail: andyjang@advancorp.com

Product Type: LCD Color Medical Monitor

Model Number: 240-031-050

Multi-listing model number: 240031050, 0240031050, 0-240-031-050, 0240-031-050, 240.031.050, 0240.031.050, 0.240.031.050, 32" 4K Surgical Display, AMM320ES
The manufacturer has declared to all the multiple model names into the basic model without any further evaluation by UL.

FCC ID: QVXAMM320ES

Trademark: N/A

Product standards: FCC Part 15 Subpart B

Test Procedure: ANSI C63.4 : 2014

Sample Serial Number: N/A

Sample Receive Date: December 23, 2015

Testing Start Date: December 27, 2015

Date Testing Complete: January 11, 2016

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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1. GENERAL PRODUCT DESCRIPTION

1.1 Report Revision History

Revision Date	Description	Remarks
-	Original	-

1.2 Equipment Description:

Description:
Auto - Scanning with digital control LCD color medical monitor

1.3 Details of Equipment Under Test (EUT):

Equipment Configuration:				
No.	Product Type	Manufacturer	Model	Comments
1	LCD Color Medical Monitor	ADVAN INT'L CORP.	240-031-050	N/A
2	Power Supply Unit	BridgePower Corp.	BPM150S24F11	-
3	Extension power cable	BridgePower Corp.	1501047022	15ft
4	Extension power cable	BridgePower Corp.	1501047020	75ft
5	Extension power cable	BridgePower Corp.	1501047021	4 pin to 5pin extension cable
6	Hospital-grade AC Power cord	-	-	-
7	HDMI Cable	-	-	-

1.4 Technical Data:

Item		Description	
Model		AMM320ES	
LCD Panel	Description	31inch, VVX31P163H00 (Panasonic)	
	Resolution	4096 x 2160	
	Display color	1,073,741,824 colors	
	Pixel Pitch	0.1704 mm x 0.1704 mm	
Brightness Contrast	Brightness	525 cd/m2	
	Contrast	1500 : 1	
Display Size		(H)697.958 x (V)368.064	
Input / Output		Input	Output
		1 x DVI 1 x HDMI 1 x HDMI 4K 1 x Display port 1 x RS-232C 1 x USB (SDC SIDNE Interface)	2 x USB POWER
Temperature	Operating	50° ~ 104°F (10° ~ 40°C)	
	Storage	0° ~ 140°F (-18° ~ 60°C)	
Power Source	Monitor	DC 24.0V / 6.25A	
	AC-Adaptor	AC 100~240V 50/60Hz	
Regulations		UL, cUL, AS/NZS 3200-1-0, CCC, CB-ITE, CE, FCC, AS/NZS 3200-1-2, IP23 Compliance	
Weight		10.3Kg (Monitor only)	
Unit Dimension		756.7(W) x 453.07(H) x 77.2(D) (mm) - Without stand	

1.5 Detail information of Multi-listing model:

-	Model	Description	Comment
1	240-031-050	Basic model	Basic model / Tested
2	240031050	Identical with basic model except model name.	Not tested
3	0240031050	Identical with basic model except model name.	Not tested
4	0-240-031-050	Identical with basic model except model name.	Not tested
5	0240-031-050	Identical with basic model except model name.	Not tested
6	240.031.050	Identical with basic model except model name.	Not tested
7	0240.031.050	Identical with basic model except model name.	Not tested
8	0.240.031.050	Identical with basic model except model name.	Not tested
9	32" 4K Surgical Display	Identical with basic model except model name.	Not tested
10	AMM320ES	Identical with basic model except model name.	Not tested
*Note: The manufacturer has declared to all the multiple model names into the basic model without any further evaluation by UL.			

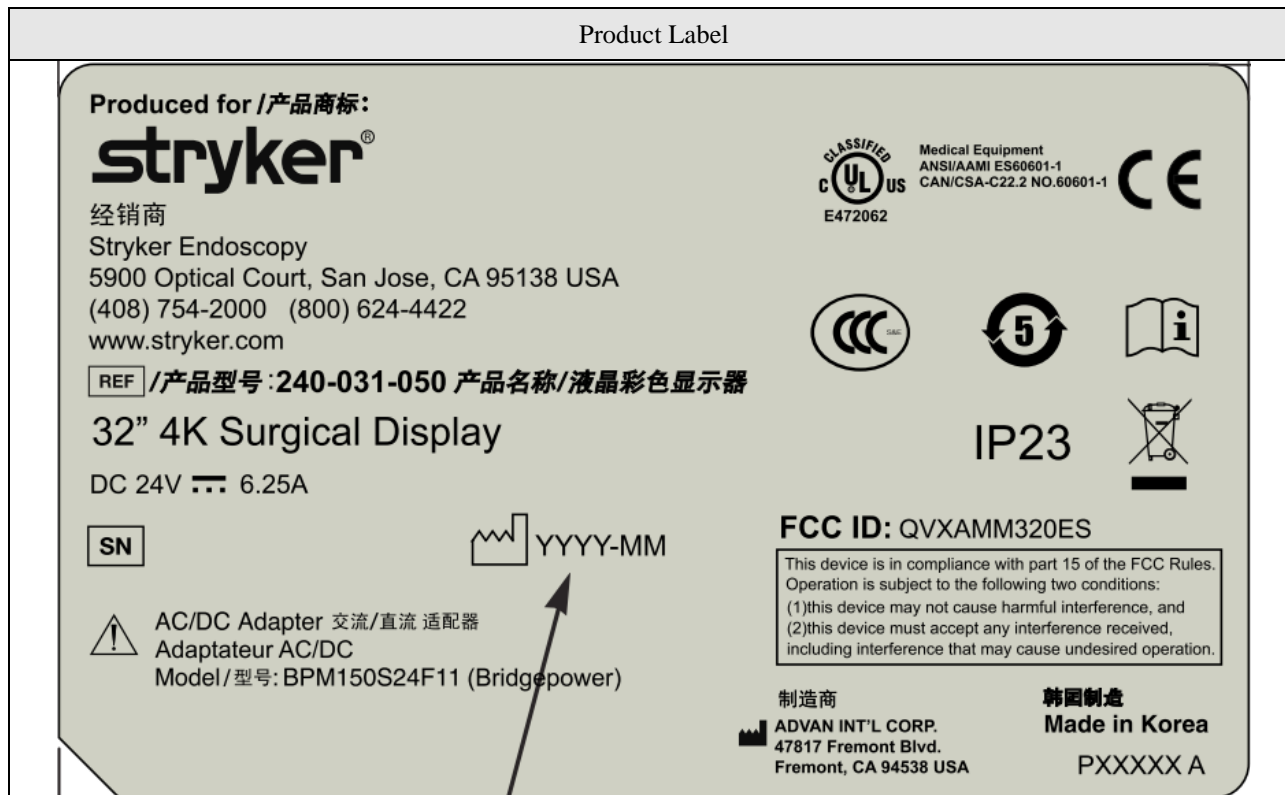
1.6 EUT Internal operating Frequency

Frequency (MHz)	Description	Frequency (MHz)	Description
74 MHz	Display Frequency	14.318 MHz	System Frequency
800 MHz	Memory Frequency	-	-

1.7 Technical descriptions and documents:

No.	Document Title and Description
1	240-031-050 User Manual
*Note: The manufacturer provided the following document.	

1.8 Equipment Marking Plate of Product:



2. TEST CONDITION

2.1 Equipment Used During Test:

Use*	Product Type	Manufacturer	Model	Comments
EUT	LCD Color Medical Monitor	ADVAN INT'L CORP.	240-031-050	-
EUT	AC/DC Adapter	BridgePower Corp.	BPM150S24F11	-
EUT	Extension power cable	BridgePower Corp.	1501047020 1501047021 1501047022	-
AE	PC	SAMSUNG	DB400T2A	DVI, HDMI, HDMI 4K, DP Source
AE	Mouse	DELL	MO56UO	-
AE	Keyboard	SAMSUNG	SKG-2200UB	-
AE	Headset	SAMSUNG	SHS-250V	-
AE	Battery Pack #1	SAMSUNG	-	-
AE	Battery Pack #2	SAMSUNG	-	-
*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	Un Shielded	Hospital-grade AC Power cord
2	DVI	I/O	3.0 m	Shielded	-
3	HDMI	I/O	2.0 m	Shielded	-
4	HDMI 4K	I/O	2.0 m	Shielded	-
5	DP	I/O	2.0 m	Shielded	-
6	SDC	I/O	2.0 m	Shielded	USB B type
7	USB	I/O	2.0 m	Shielded	Only Charging Mode (For Accessory)
8	USB	I/O	2.8 m	Shielded	Only Charging Mode (For Accessory)
9	Power(AE PC)	AC	1.8 m	Un Shielded	-
10	USB(Keyboard)	I/O	1.8 m	Shielded	-
11	USB(Mouse)	I/O	1.8 m	Shielded	-
12	Headset	I/O	2.0 m	Un Shielded	-
<p>* 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</p> <p>* SDC port is used for DVI mode only.</p> <p>* RS-232 port is used for service purpose only. No user interface port.</p>					

2.3 Power Interface:

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Comments
Rated	AC 100-240 V	2.5 A	-	50-60 Hz	Rated of Power Supply
1	AC 120 V	-	-	60 Hz	-

2.4 Test Operating Mode:

Mode #	Mode	Comments
1	DVI Mode ²⁾	Worst case condition
2	HDMI Mode	-
3	HDMI 4K Mode	Worst case condition
4	DP 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 is connected to PC as SDC communication mode when EUT is DVI Mode.
3. EUT have been performed under continuous displaying "H" Patten

2.5 Modes of Video Resolution:

Mode #	Resolution	Comments
1	DVI Mode	1920 * 1080 @ 60Hz Worst case condition (Range of Brightness: 100, Range of contrast: 100 And range of backlight: 100)
2	HDMI 4K Mode	3840 * 2160 @ 60Hz Worst case condition (Range of Brightness: 100, Range of contrast: 100 And range of backlight: 100)

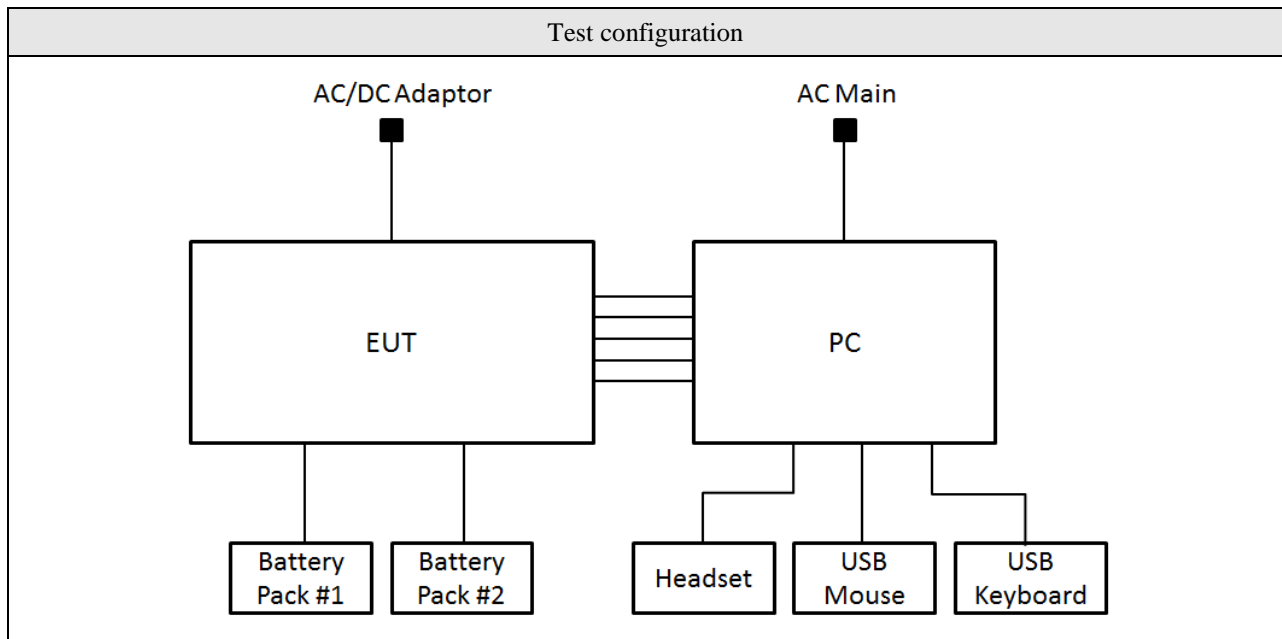
*** Note:** Video resolution where it refers from above is representative worst case.

2.6 Used DC Extension Cable for EMC Test:

No.	Cable Length	Preliminary Test	Comment
1	15ft	DVI, HDMI, HDMI 4K, DP Mode.	-
2	75ft		Worst case condition

*** Note:** Radiated emission and conducted emission test were performed for all extension power cable during the preliminary testing and selected worst-case condition (75ft) for final measurements.

2.7 Test Configuration:



2.8 Result of Testing:

No	Test requirements	Standard	Results	Verdict
1	AC Power line Conducted Emission Test	47 CFR Part 15.107(a) / 47 CFR Part 15.109(a) Class B	Met limit Class B	Complied
2	Radiated Emission Test		Met limit Class B	Complied
* Note: This product has been tested in accordance with the measurement procedures specified 47 CFR Part 15.107 (a) / 47 CFR Part 15.109 (a) Class B at the KCTL Laboratory and the test results has been shown to be complied with the EMC requirements specified in the standard above.				

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			12.0 %	
-	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 2.7)	
1		1, 3		1	
Conducted Emissions Test Equipment used:					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Test Receiver	R&S	ESCI	100001	2015-08-04	2016-08-04
TWO-LINE V-NETWORK	R&S	ENV216	101358	2015-09-03	2016-09-03
TWO-LINE V-NETWORK	R&S	ESH3-Z5	100267	2015-06-16	2016-06-16

Figure 1. Test Data of conducted emissions, DVI Mode

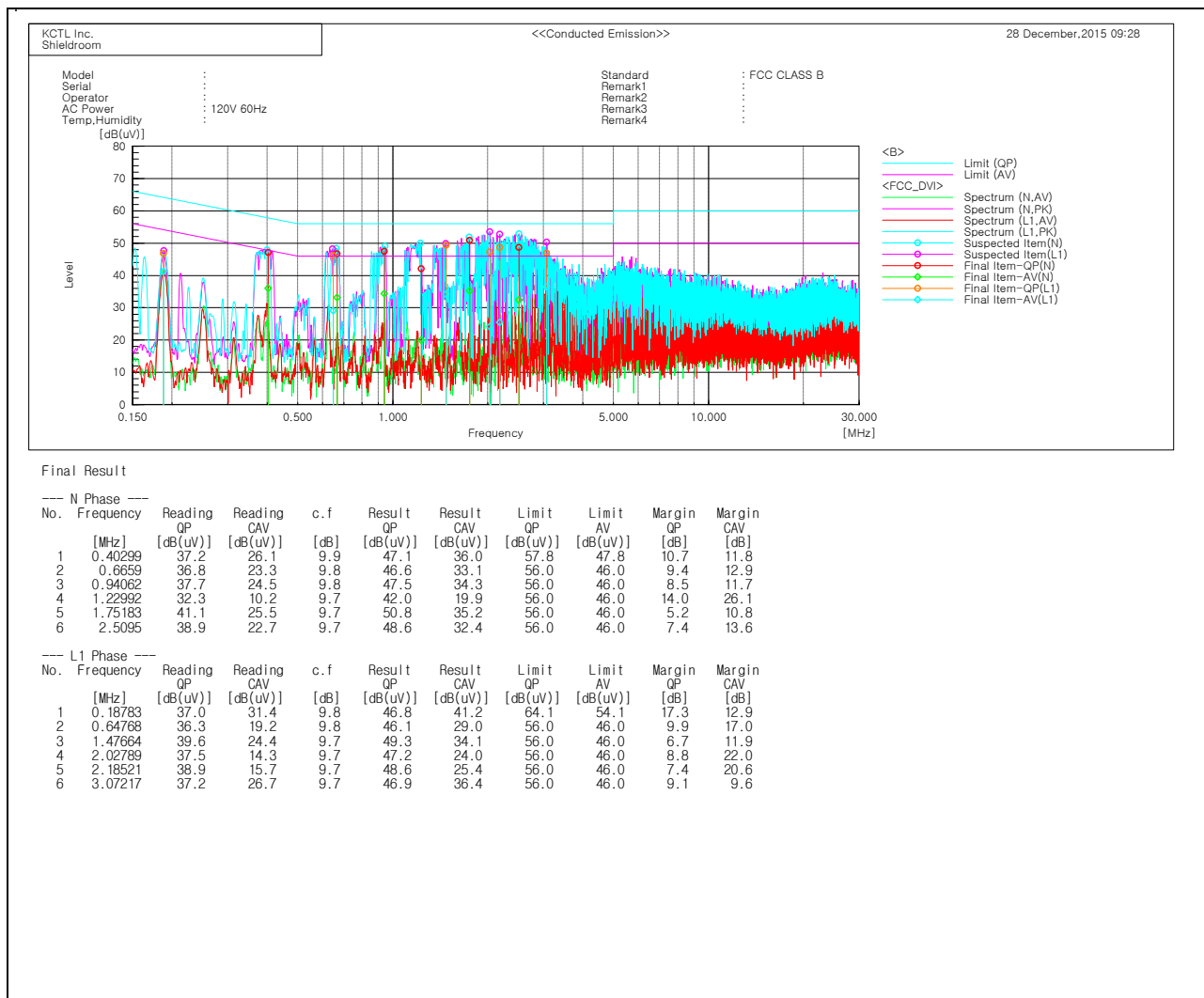
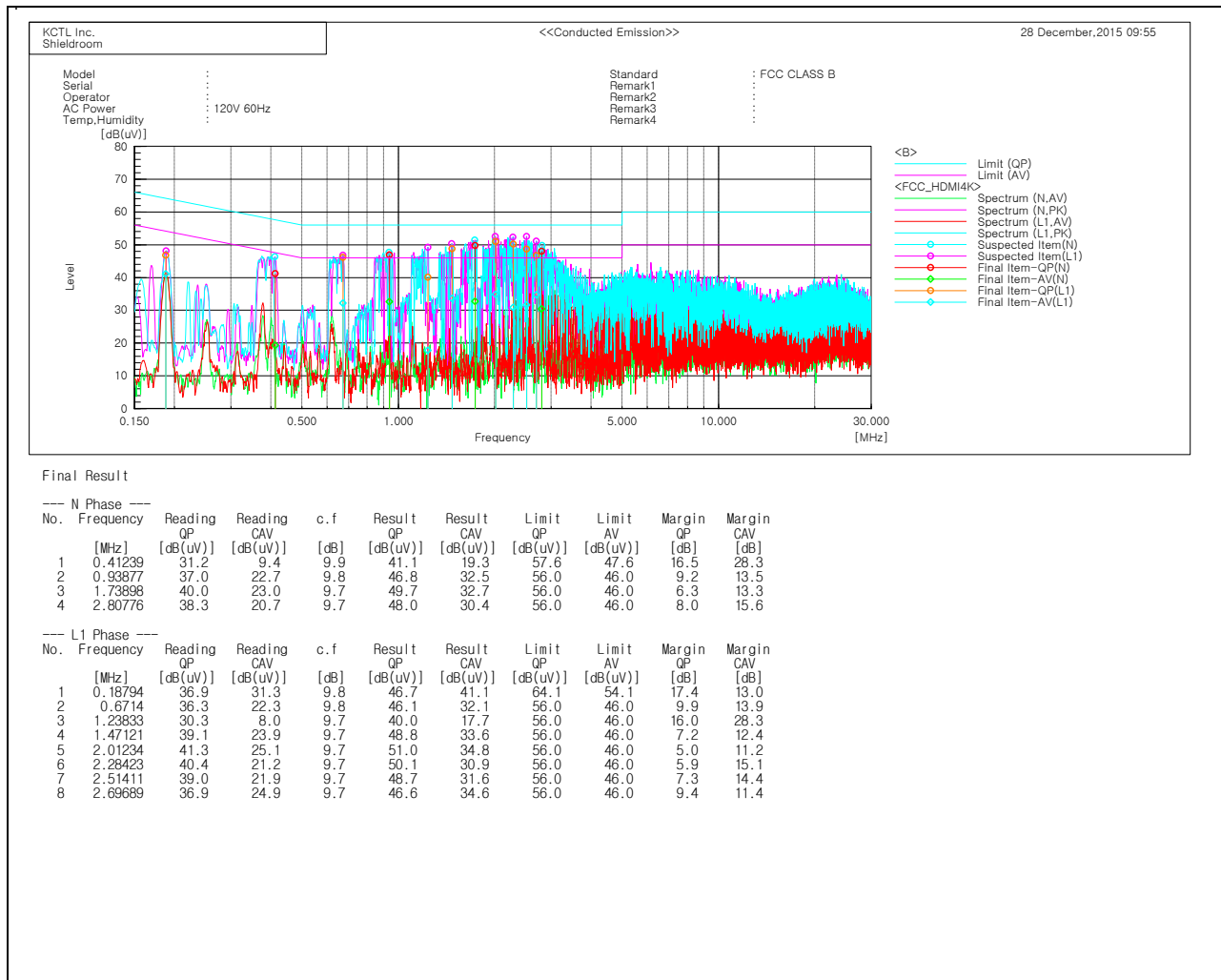


Figure 2. Test Data of conducted emissions, HDMI 4K Mode



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.				
	The measurements (above 1 GHz) were made 3 m distance test site. The EUT was placed on a non-conductive turntable approximately 0.8 m above the ground plane. The turntable with EUT was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels.				
	This procedure was performed for both horizontal and vertical polarization of the receiving antenna.				
	The measurements were conducted with Average and Peak value.				
Basic Standards		FCC Part 15			
Parameters recorded during the test		Laboratory Ambient Temperature		24.7 °C	
		Relative Humidity		9.7 %	
-		Frequency range		Measurement Point	
Fully configured sample scanned over the following frequency range		30 MHz – 1.0 GHz		3 meter measurement distance	
		1.0 GHz ~ 6.0 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		43.52		Pass	
216 to 960		46.02		Pass	
960 to 1000		53.97		Pass	
-		Average	Peak	-	
Above 1000		54	74	Pass	
EUT Configuration Settings:					
Power Interface Mode # (See Section 2.3)		EUT Operation Mode # (See 2.4)		EUT Configurations Mode # (See Section 2.7)	
1		1, 3		1	
Radiated Emissions Test Equipment:					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due

Order Number: 11070973
Model Number: 240-031-050

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Test Receiver	R&S	ESR	101078	2015-09-02	2016-09-02
Bi-Log Antenna	TESEQ	CBL 6112D	37876	2015-08-28	2016-08-28
Amplifier	SONOMA INSTRUMENT	310N	293004	2015-09-02	2016-09-02
Coaxial Fixed Attenuator	HP	8491A	16861	2015-06-29	2016-06-29
Antenna Mast	MATURO	AM4.0	079/3440509	-	-
Turn Table	MATURO	CO2000-SOFT	-	-	-
Preamplifier	AGILENT	8449B	3008A01802	2015-07-30	2016-07-30
Horn ANT	ETS	3115	00086706	2015-09-02	2016-09-02

Figure 3. Test Data of DVI Mode, 30 MHz to 1 GHz

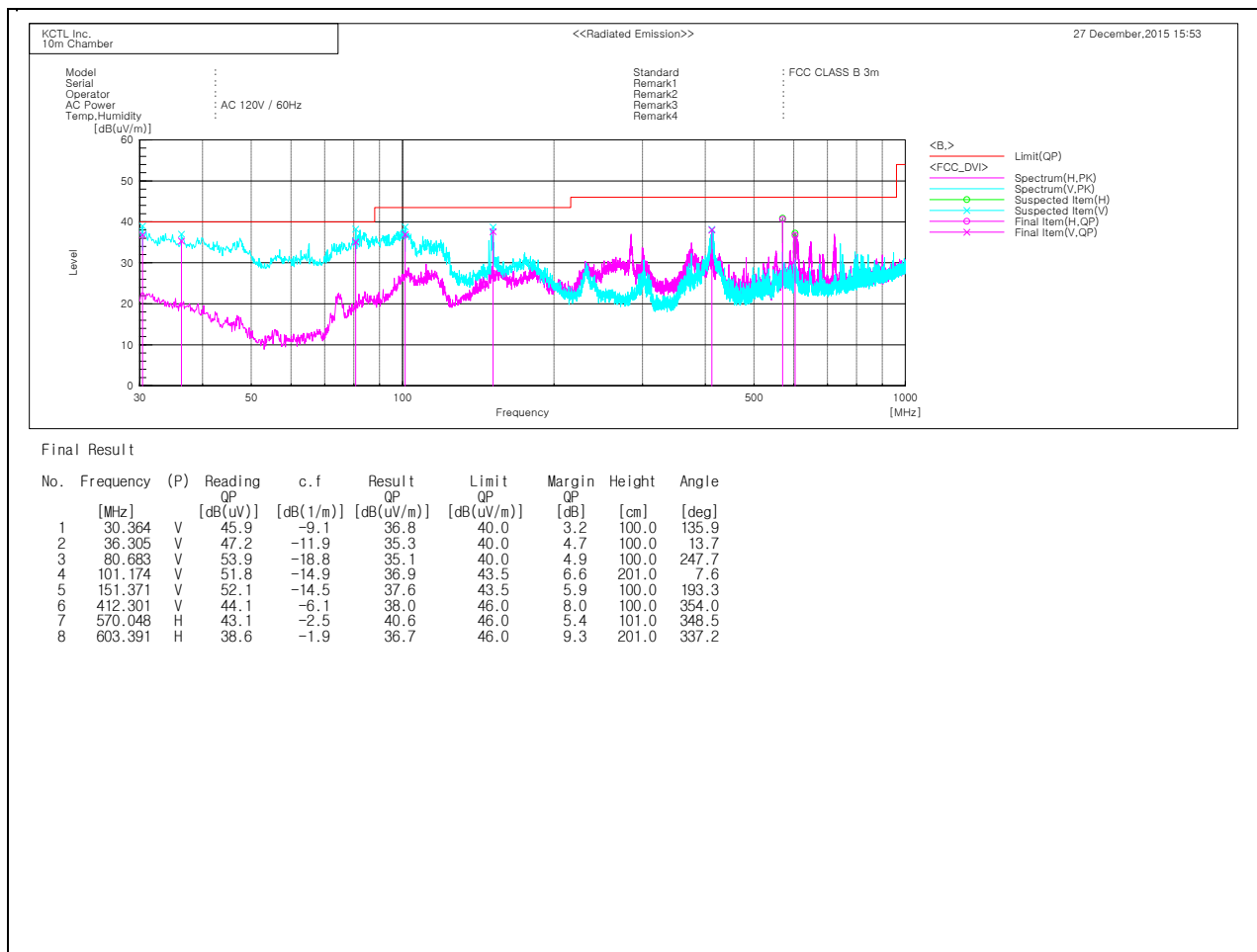


Figure 4. Test Data of DVI Mode, 1 GHz to 6 GHz

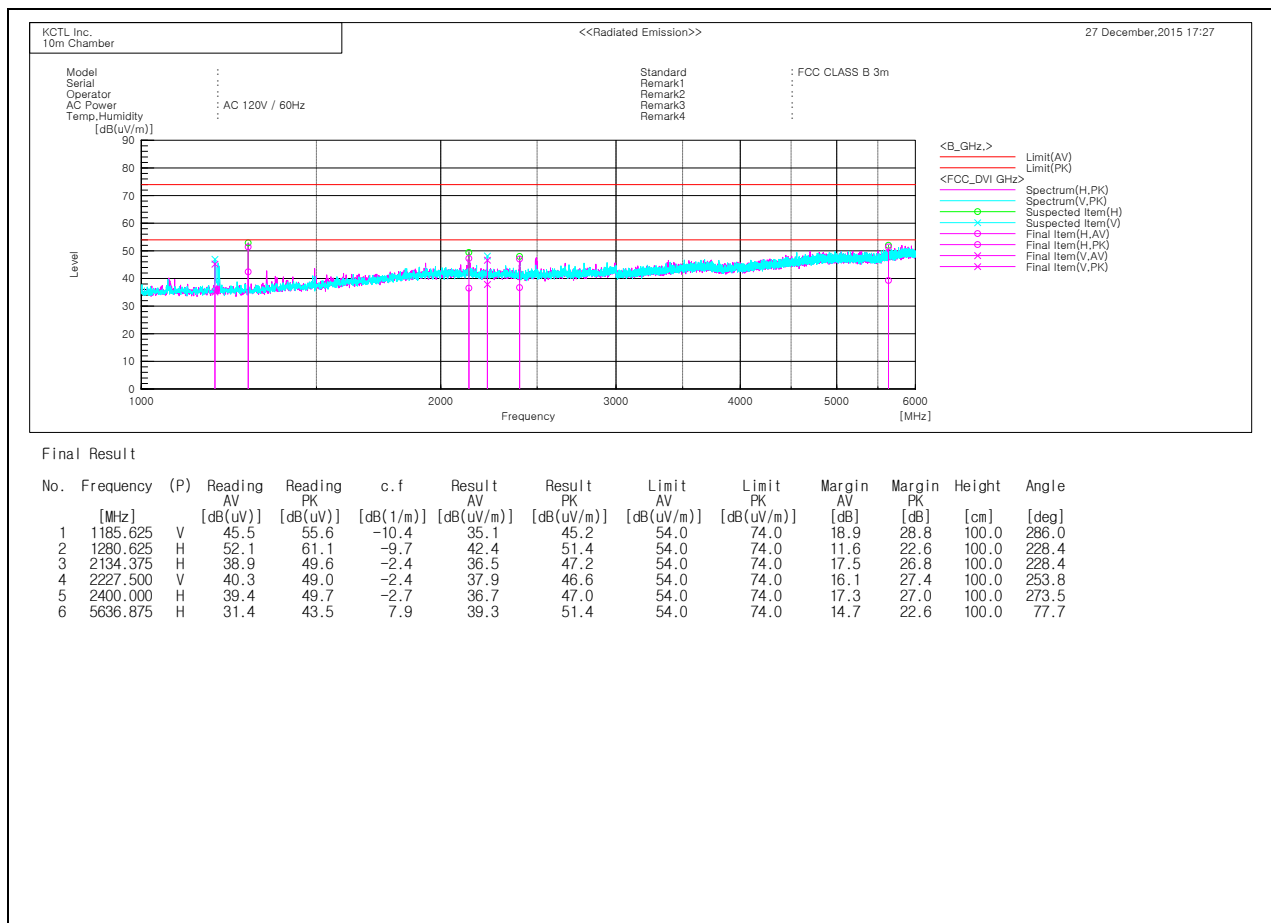


Figure 5. Test Data of HDMI 4K Mode, 30 MHz to 1 GHz

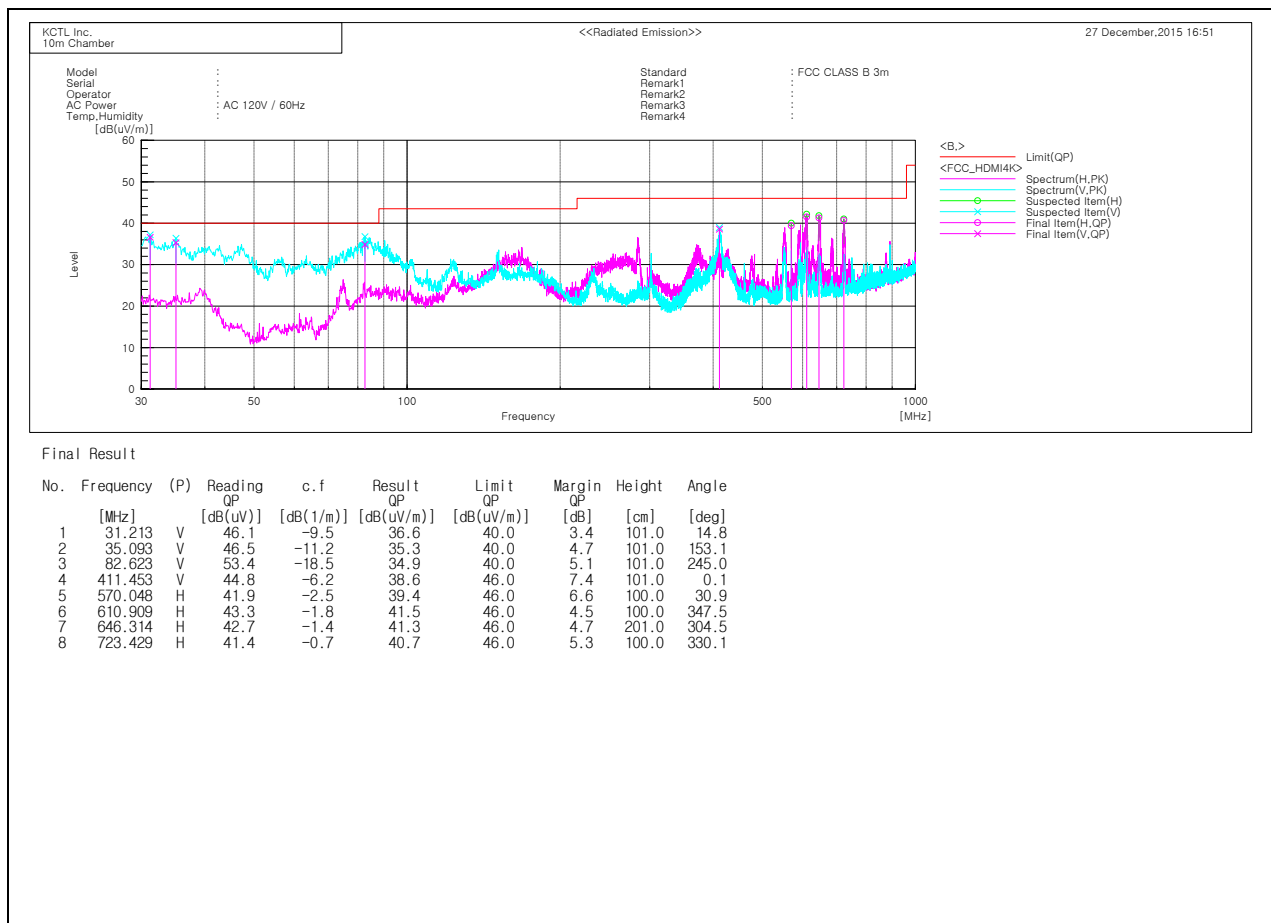
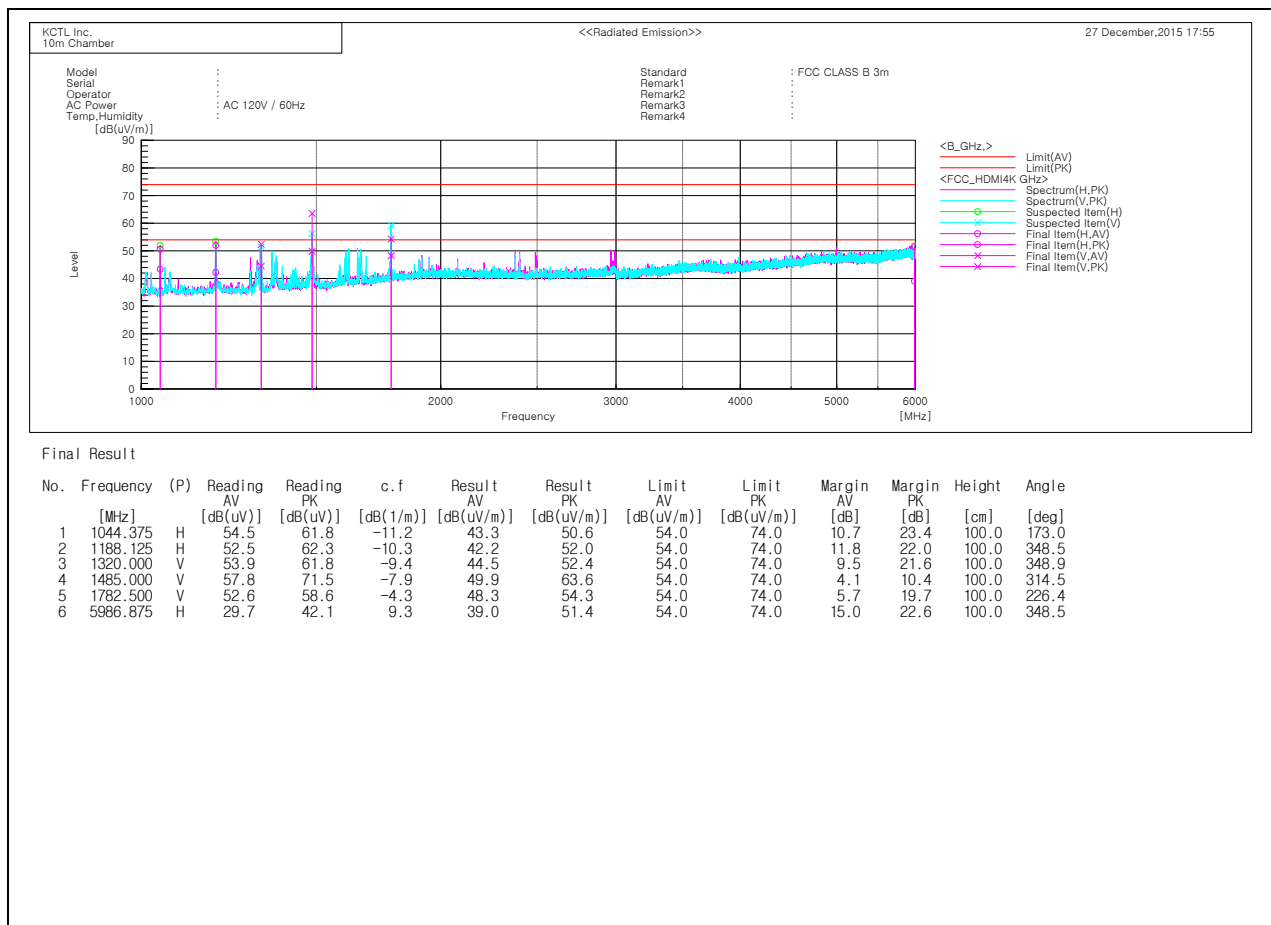


Figure 6. Test Data of HDMI 4K Mode, 1 GHz to 6 GHz



APPENDIX A: Test Facility



KOLAS: Accredited by Korea Laboratory Accreditation Scheme (KOLAS) as Testing Laboratory in accordance with the provisions of Article 23 of the National Standards Act. These criteria encompass the requirements of ISO/IEC 17025:2000.

KOLAS No.: 231



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 April 01, 2005 (FCC CAB: KR0040).



Industry Canada Industrie Canada

Industry of Canada: Accredited by Industry Canada for performance of radiated measurements.
Industry Canada Registration No.: 8035A



VCCI: Accepted as an Associate Member to the VCCI. The measurement facilities detailed in this test
VCCI Registration No.: R-3327, G-198, C-3706, T-1849