



Underwriters Laboratories Inc.

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Order: 11038841

Report: 15-11038841-FCC

Date: December 18, 2015

Model: AMM213TD2

FCC ID: QVXAMM213TD2

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.
December 18, 2015



Reviewed by
Changmin Kim, WiSE Engineer
Consumer Technology Division
UL Korea Ltd.
December 18, 2015

Test Report Details

Test report No: 15-11038841-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: AMM213TD2

FCC ID: QVXAMM213TD2

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 03, 2015

Testing Start Date: December 09, 2015

Date Testing Complete: December 16, 2015

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 Equipment Description:

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

1.2 Details of Equipment Under Test (EUT):

Equipment Configuration:				
No.	Product Type	Manufacturer	Model	Comments
1	LCD Color Medical Monitor	ADVAN INT'L CORP.	AMM213TD2	N/A
2	Power Supply Unit	BridgePower Corp.	BPM150S24F10	-
3	Extension power cord	BridgePower Corp.	1501047002	5ft
4	Extension power cord	BridgePower Corp.	1501047	15ft
5	Extension power cord	BridgePower Corp.	1501047001	75ft
6	Hospital-grade AC Power cord	-	-	-
7	DVI-D Cable	-	-	-
8	HD15 VGA Cable	-	-	-
9	Composite Video BNC Jack Cable	-	-	-
10	Super Video Cable	-	-	-

1.3 Technical Data:

Model	AMM213TD2		
Description	a-Si TFT Active Matrix, LED Backlight		
Active Screen Size	21.3 inches diagonal		
Resolution	1600 (H) x 1200 (V) @60Hz		
Pixel Pitch	0.270 mm		
Display Color	16.7M colors		
Color Tone	Up to 256 color tone		
Response Time	Rise time (Tr) : 11ms Fall time (Tf) : 9ms Typ.		
Face Finishing	Protective Filter with Anti-Reflected Hard Coated		
Viewing Angle	R/L 178°, U/D 178° (CR ≥ 10)		
Brightness**	440 cd/m2 (Typ.)		
Contrast Ratio	1400:1 (Typ.)		
Input		Output	
Composite Video	BNC x 1 1.0 Vp-p	Composite Video	BNC x 1 1.0 Vp-p
Y/C Video	4 pin Mini Din x 1	Y/C Video	4 pin Mini Din x 1
	Luminance (Y) : 1.0± 0.1Vp-p		Luminance (Y) : 1.0± 0.1Vp-p
	Chrominance (C) : 0.3± 0.03Vp-p		Chrominance (C) : 0.3± 0.03Vp-p
Component/RGB	BNC x 5 (Y/Pb/Pr, RGBs, R/G/B/H/V)	Component/RGB	BNC x 5 (Y/Pb/Pr, RGBs, R/G/B/H/V)
	RGB: 0.7 ± 0.1 Vp-p		RGB: 0.7 ± 0.1 Vp-p
	Composite Sync : 0.3Vp-p ~ 5Vp-p		Composite Sync : 0.3Vp-p ~ 5Vp-p
	H/V SYNC : TTL Level		H/V SYNC : TTL Level
SDI1/2	3G/HD/SD SDI, BNC x1	SDI	3G/HD/SD SDI, BNC x1
VGA	15pin D-Sub x 1		
	R/G/B : 0.7 ± 0.1 Vp-p		
	H/V Sync : TTL Level (V high ≥2.3V, V low ≤0.5V)		
DVI	DVI-I x 1		
SOG	Sync on green		
	1.0 Vp-p		
Remote Input	9-pin D-Sub (RS-232C) x 1		
Scanning Frequency	Horizontal : 31.47~79.98Khz Vertical : 50~85Hz		
General			
Power Adaptor	AC 100 ~ 240V 50-60Hz, 2.0A		
	DC 24V, 6.25A		
Power Consumption	52W		
Dimension	512 (W) x 388.9 (H) x 95.5 (D) mm		
Weight	Monitor : 6.89Kg		
	AC adaptor : 690g		
VESA Mounting	100mm x 100mm		
Operating/Storage Environment			
Operating Temperature	32° ~ 95°F (0° - 35°C)		
Operating Humidity	20% ~ 80%, non-condensing		
Storage Temperature	-4° ~ 140°F (-20° - 60°C)		
Storage Humidity	10 ~ 85%RH (without condensation)		
Compliance & Certification			
Safety	UL (UL60601-1), cUL (CAN/CSA-C22.2 No.6011-M90), CE (EN60601-1), AS/NZS 3200-1-0, CCC (GB4943-2001), CB-ITE (IEC60950-1), IPX1 Compliance		
EMC	FCC (Part Class B), CE (EN60601-1-2), AS/NZS 3200-1-2, VCCI (Class B), CCC (GB9254, GB17625.1)		
Optional Module			
DC Extension Cable	5ft, 15ft, 75ft length		
Base Stand	Adjustable high, swivel and tilt base stand		

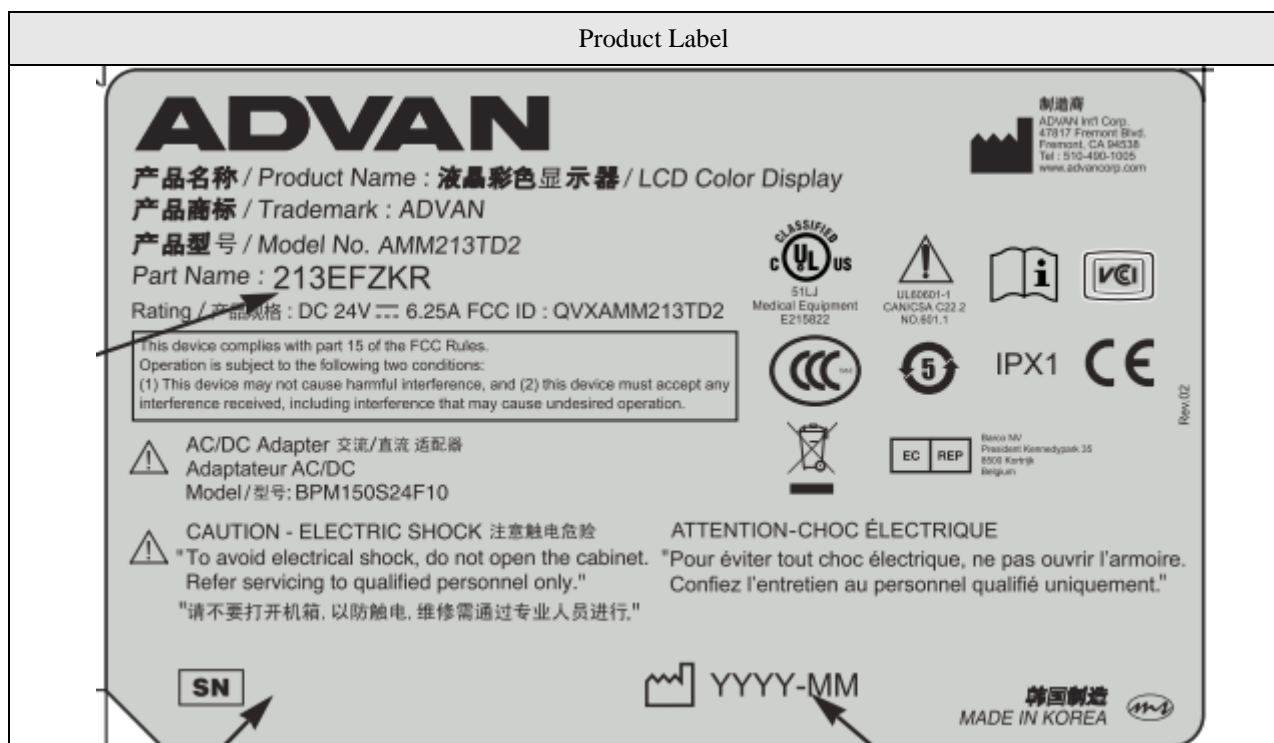
1.4 EUT Internal operating Frequency

Frequency (MHz)	Description	Frequency (MHz)	Description
77 MHz	Display Frequency	10.00 MHz	CPLD Clock
11.059 2 MHz	U-Com Frequency	27.00 MHz	System Clock
324.00 MHz	Memory Clock	-	-

1.5 Technical descriptions and documents:

No.	Document Title and Description
1	AMM213TD2 User Manual
*Note: The manufacturer provided the following document.	

1.6 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.	AMM213TD2	-
EUT	AC/DC Adapter	BridgePower Corp.	BPM150S24F10	Contain Two Ferrite core
EUT	Extension power cord (optional)	BridgePower Corp.	1501047002 (5ft), 1501047 (15ft), 1501047001 (75ft)	Contain Two Ferrite core
AE	LCD Monitor	ADVAN INT'L CORP	AMM240WTD	-
AE	AC/DC Adapter	BridgePower Corp.	BPM150S24F10	-
AE	PC	SAMSUNG	DB400T2A	DVI, VGA Source
AE	DVD Player	SONY	DVP-NS76H	C-Video, S-Video, Component source
AE	Mouse	DELL	MO56UO	-
AE	Keyboard	SAMSUNG	SKG-2200UB	-
AE	Headset	SAMSUNG	SHS-250V	-
AE	SDI Converter	Gefen	Converter	-
* 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	VGA	I/O	2.0 m	Shielded	-
3	DVI	I/O	3.0 m	Shielded	-
4	SDI	I/O	3.0 m	Shielded	BNC type
5	S-Video	I/O	3.0 m	Shielded	S-Video Cable
6	CVBS	I/O	3.0 m	Shielded	CVBS Cable
7	RGB/COMPONENT	I/O	3.0 m	Shielded	BNC type
8	Power(AE DVD)	AC	1.8 m	Un Shielded	-
9	Power(AE Monitor)	AC	1.8 m	Un Shielded	-
10	Power(AE SDI Converter)	AC	1.8 m	Un Shielded	-
11	Power(AE PC)	AC	1.8 m	Un Shielded	-
12	USB(Keyboard)	I/O	1.8 m	Shielded	-
13	USB(Mouse)	I/O	1.8 m	Shielded	-
14	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>* 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 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	VGA Mode	Worst case condition
3	SDI Mode	Worst case condition
4	S-VIDEO In/Out Mode	-
5	CVBS In/Out Mode	-
6	Component Mode/ RGBS 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 2
3. EUT has been performed under continuous displaying “Color Bar” Patten for configuration Modes of 3 to 6.

2.5 Modes of Video Resolution:

Mode #	Resolution	Comments
1	VGA Mode	640 * 480 @ 60Hz
2		1024 * 768 @ 75Hz
3		1600 * 1200 @ 60Hz
4	SDI Mode	1080i

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

2.6 Used D.C. Extension Cable for EMC Test:

No.	Cable Length	Preliminary Test	Comment
1	5ft	DVI, VGA, SDI, S-Video, C-Video, Component Mode.	-
2	15ft		-
3	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.

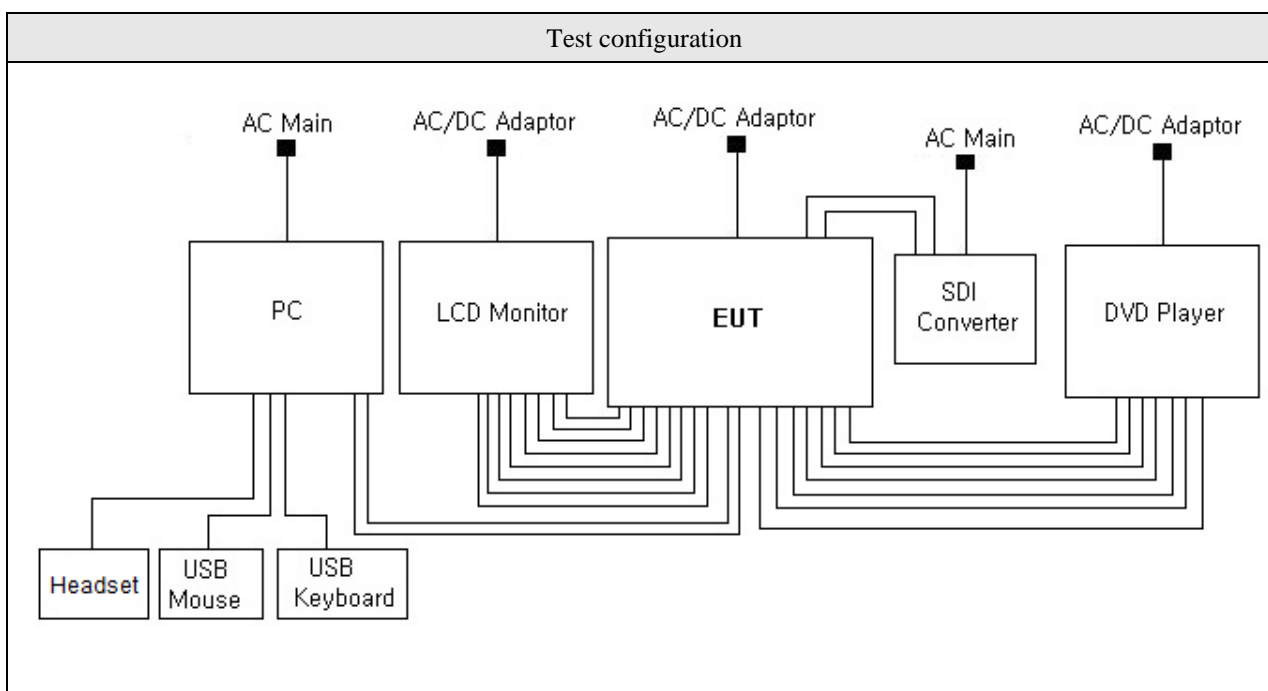
Extension power cord (optional)
Manufacturer: Bridgepower
Part No: CB-47D2001P50MF (5ft) or
CB-47D2004P57MF (15ft) or
CB-47D2022P86MF (75ft)

Hospital-grade power cord

Power Supply
Model No: BPM150S24F10

AMM213TD2

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		21.6 °C	
		Relative Humidity		27.8 %	
-		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		2, 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, VGA Mode

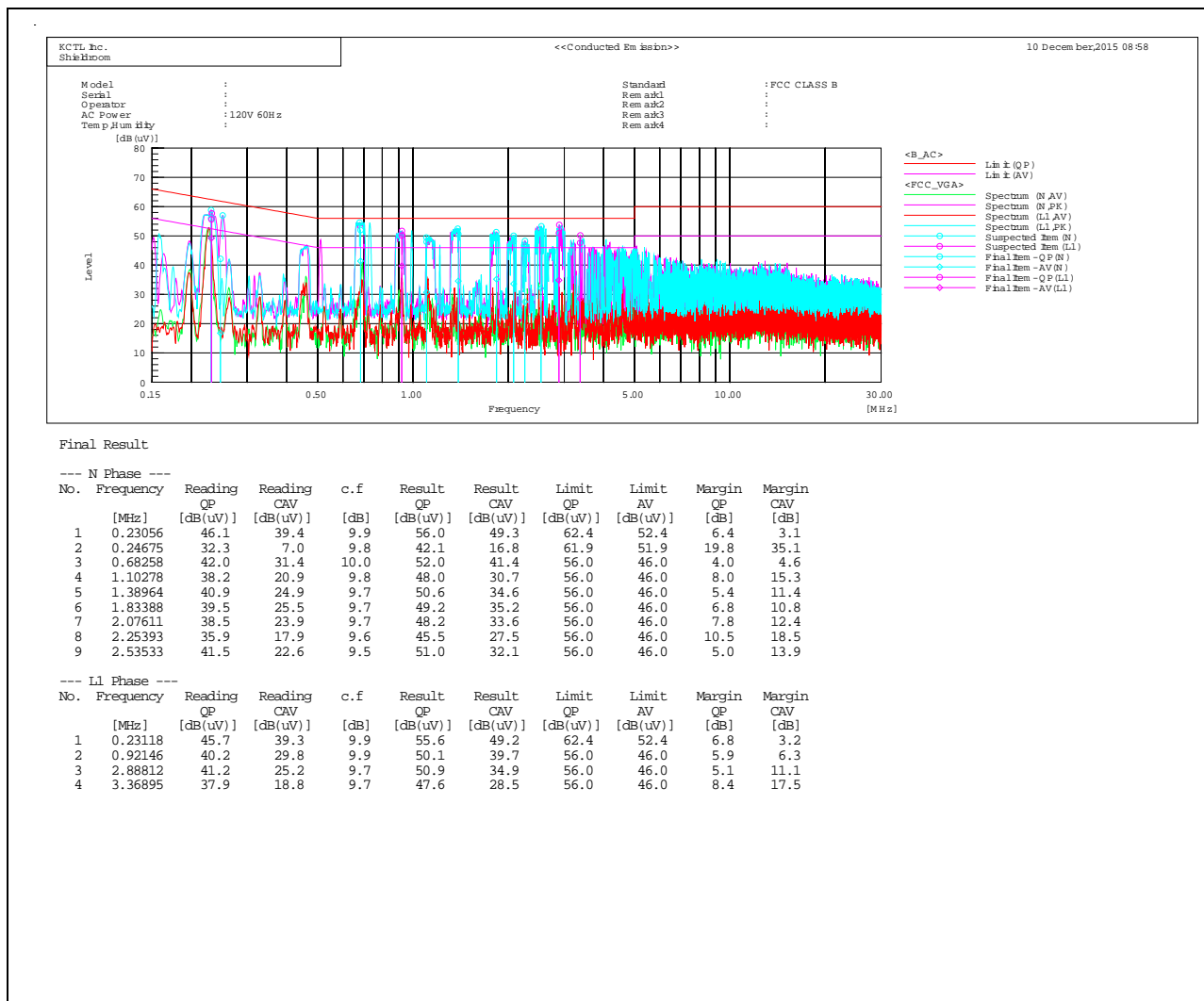
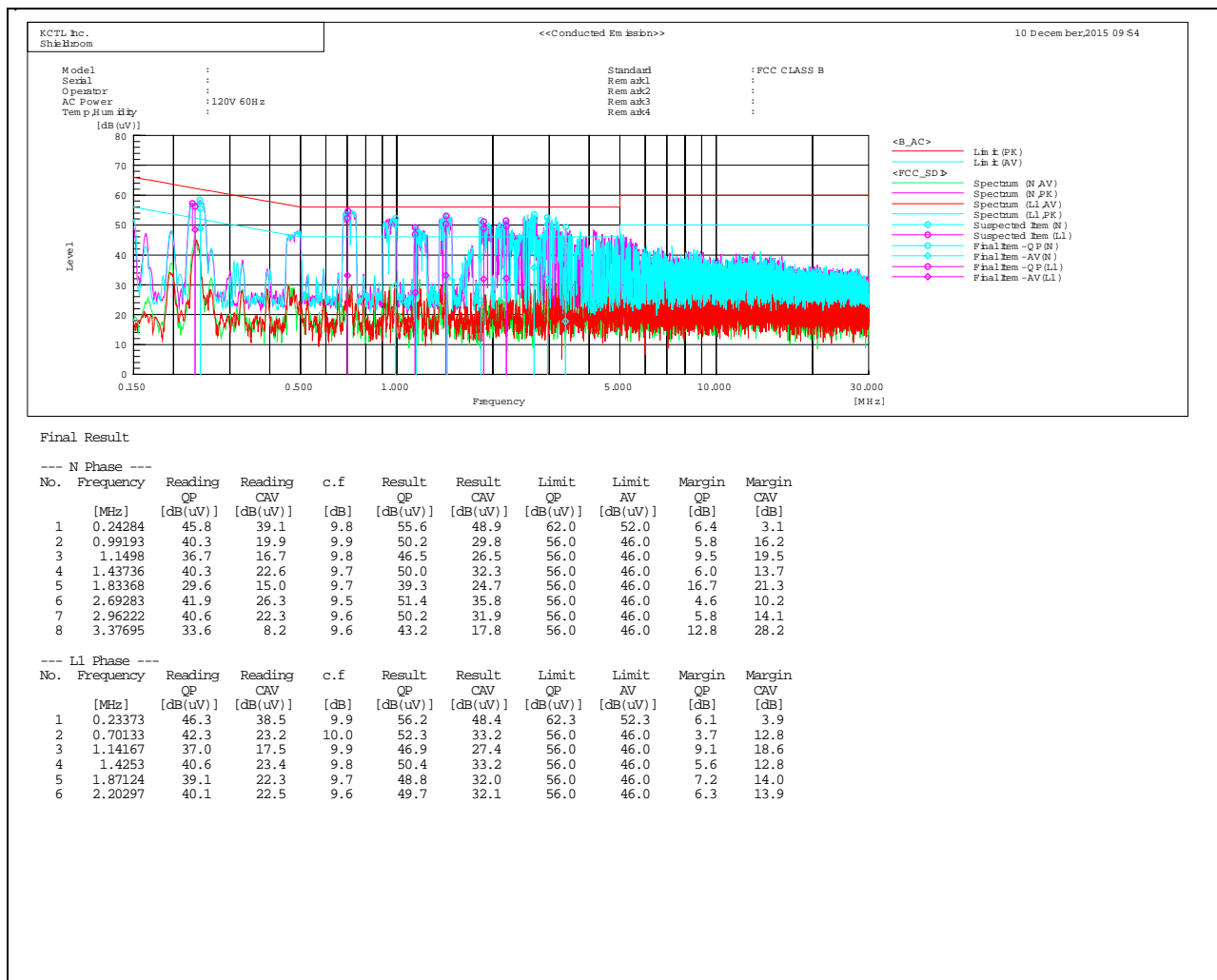


Figure 2. Test Data of conducted emissions, SDI Mode



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		16.2 °C	
		Relative Humidity		33.7 %	
-		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		2, 3		1	
Radiated Emissions Test Equipment:					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due

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 VGA Mode, 30 MHz to 1 GHz

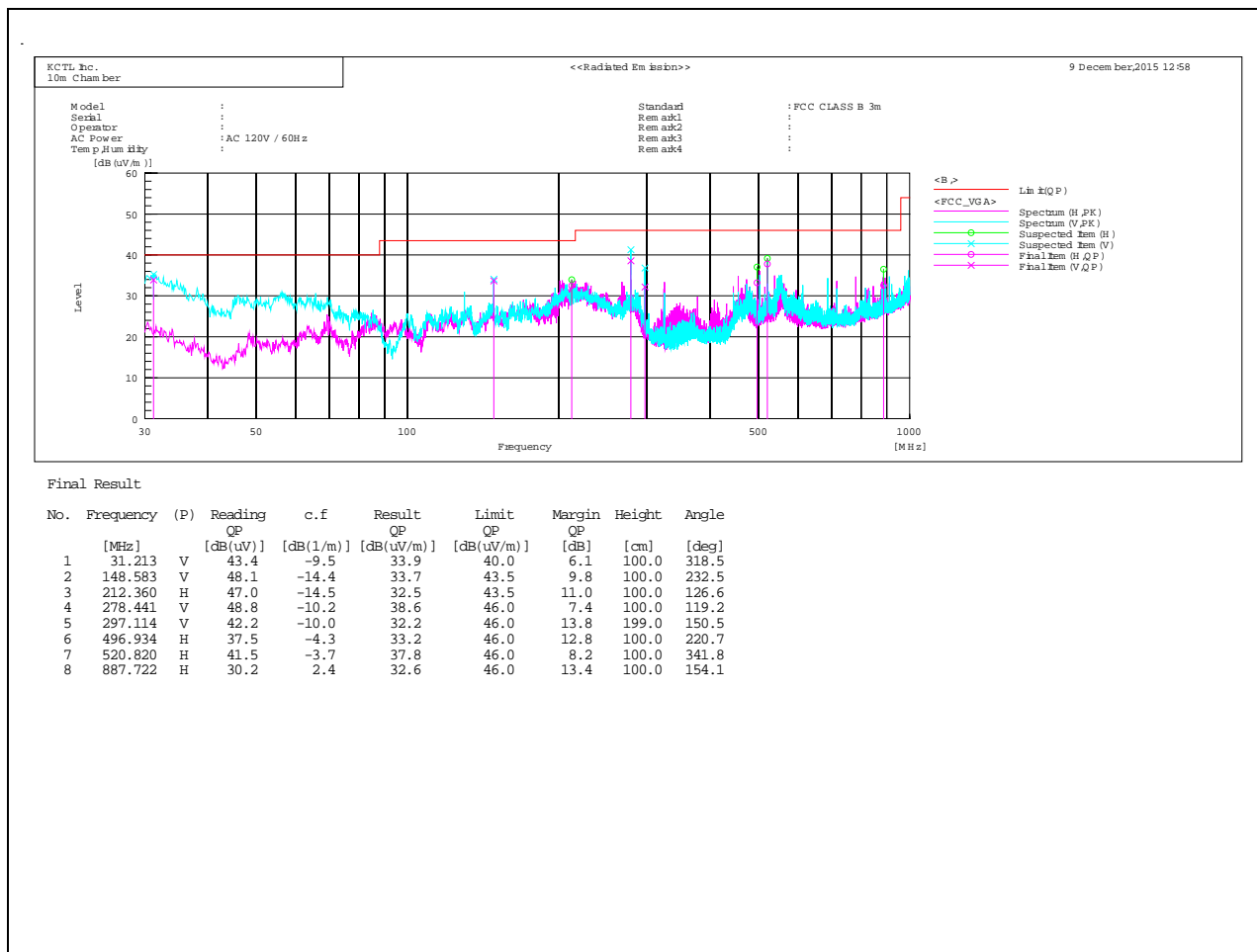


Figure 4. Test Data of VGA Mode, 1 GHz to 6 GHz

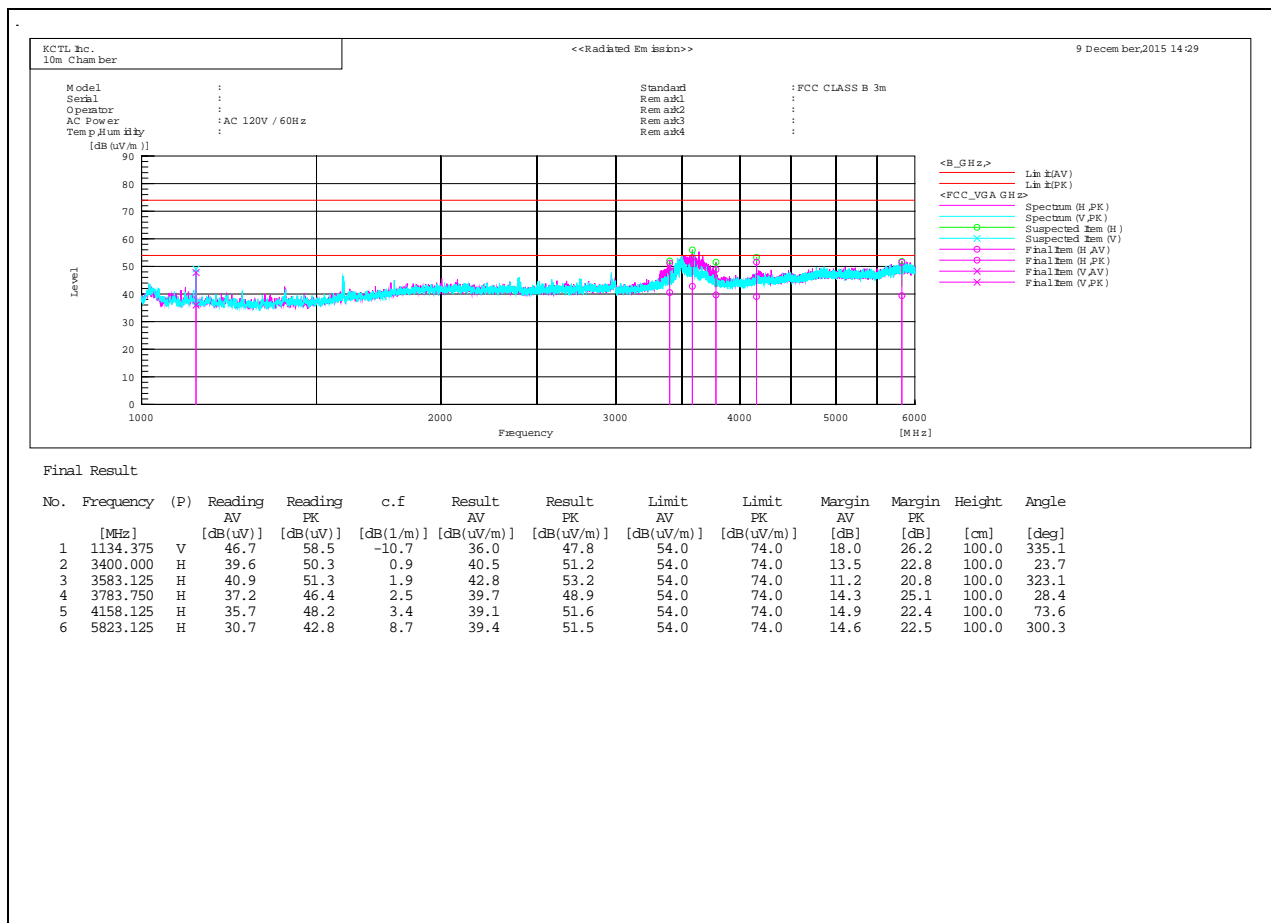


Figure 5. Test Data of SDI Mode, 30 MHz to 1 GHz

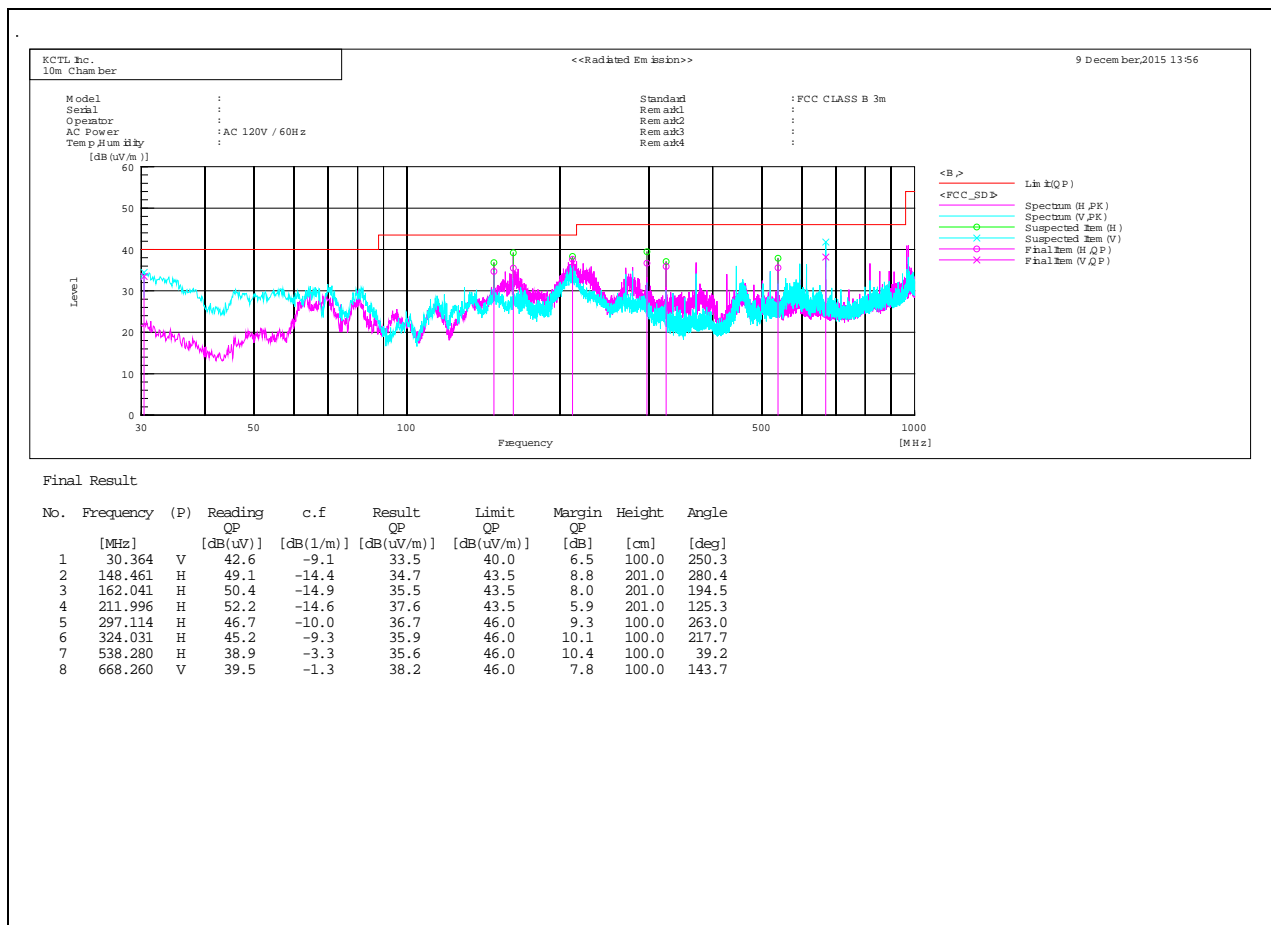


Figure 6. Test Data of SDI Mode, 1 GHz to 6 GHz

