FCC TEST REPORT

UCS Co., Ltd.

#702, Megavalley, 799 Kwanyang-dong, Dongan-gu, Anyang-city, Kyunggi-do, 431-767, Korea
Tel : 82-31-420-5680/Fax :82-31-420-5685, Open Site : 82-31-355-2666

FCC Test Report

Report Number	UCSFR-1205-004			
Applicant	Company Name	KyungBong Co., Ltd.		
	Address	Kyungbong Building 899-5, Hogye-dong, Dongan-gu, Anyang-si, Gyeonggi-do, Korea 431-060		
Product	Product Name	DVD Rental Machine		
	Model Name	LOTUS 711A-AHL	Manufacturer	KyungBong Co., Ltd.
	Serial No.	-	Country of origin	Korea
Other	Receipt Date	2012-04-10	Receipt Number	UCS-R-2012-189
	Issued Date	2012-05-10	Tested Date	2012/05/04 ~ 2012/05/08
Test Result	**Pass**			
Standard	**FCC CFR 47 Part 15 Subpart C**			
Test Method	**ANSI C63.4:2003**			
Tested by	Y. R. JO (sign)			
Approved by	K. T. Kim (sign)			

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Contents

1. Applicant Information

Applicant Name	:	KyungBong Co., Ltd.
Address	:	Kyungbong Building 899-5, Hogye-dong, Dongan-gu, Anyang-si, Gyeonggi-do, Korea 431-060
Manufacturer	:	KyungBong Co., Ltd.
Country of Origin	:	Korea

2. Test Result Certification

2.1 Applicable standards

Standard	Test Item	CFR 47 Section	Result
FCC CFR 47 Part 15 Subpart C	Radiated Electric Field Emissions	15.225(a)	PASS
	Radiated Electric Field Emissions	15.225(b) (c)	PASS
	Radiated Electric Field Emissions	15.225(d)	PASS
	Frequency Stability	15.225(e)	PASS
	AC Power Line Conducted Emissions	15.207	PASS

3. EUT Information

3.1 RF specification

Product name	DVD Rental Machine
Model name	LOTUS 711A-AHL
Power source	AC 120 V
Operating Ferquency	13.562 MHz
Number of channels	1 CH
Weight	750(L)mm X 900(W)mm X 1920(H)mm
Dimension	250 kg

4. Laboratory Information

4.1. General

UCS Co., Ltd. established 1999 as the International agreed upon laboratory(CBTL, KOLAS) for Standard. Internally, UCS Co., Ltd. is the designated test laboratory from Radio Research Laboratory of Korea Communications Commission and Korea Food & Drug Administration.

Based on its extensive experience and expertise, UCS Co., Ltd. is the Global test laboratory that has best professionalism in this field.

4.2. Test Site

- UCS Co., Ltd. (Universal Certification Solution)
- FCC Registration Number : 803225
- This test site is in compliance with ISO/IEC 17025 for general requirements for the competence of testing and calibration laboratories.

4.3 Location

UCS Co., Ltd.

- #702, Anyang Megavalley799, Gwanyang2-dong, Dongan-gu, Anyang-si, Gyeonggi-do, 431-767, Korea

ER Center

- #476-4, Hwalcho-dong, Hwaseong-si, Gyeonggi-do, 445-150, Korea

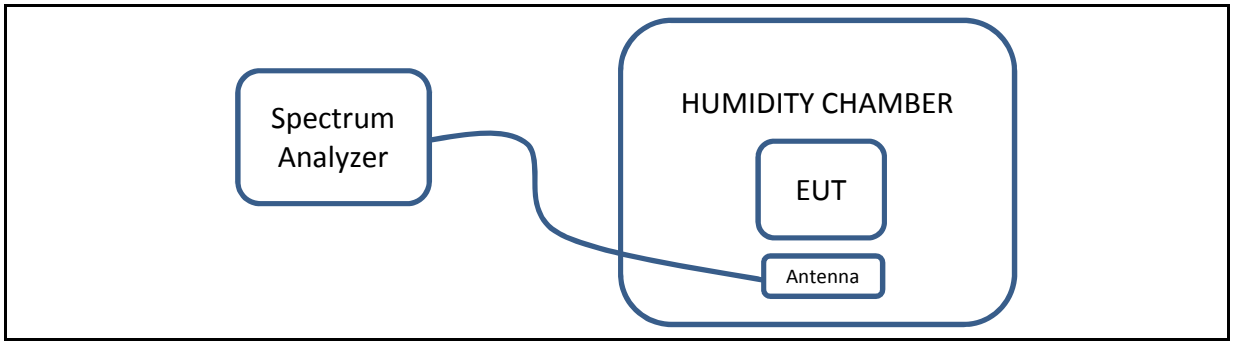
5. Measurement conditions

5.1 Description of test modes

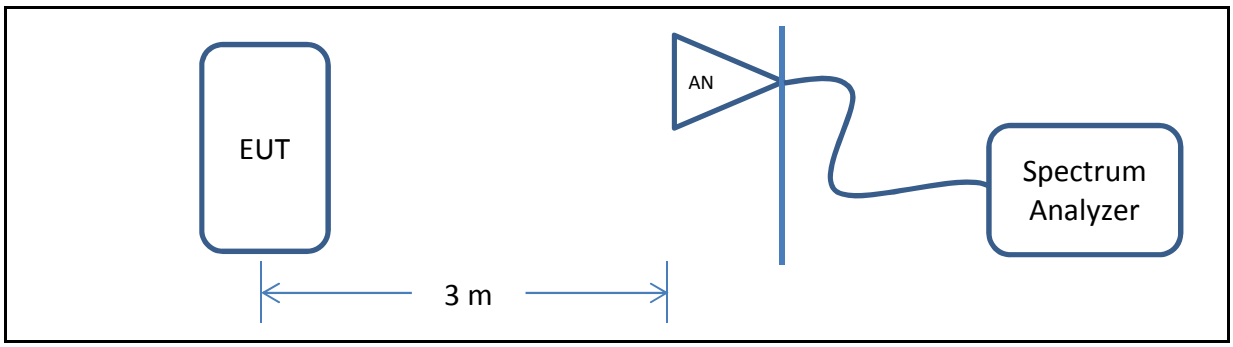
- The EUT had been tested under the operating condition.
- There are one channels have been tested as following:

Channel	Frequency (MHz)
Fundamental	13.562

5.2 Description of test configuration



[System Block Diagram of Test Configuration 1]



[System Block Diagram of Test Configuration 2]

5.3 Setup of equipmet under test

5.3.1. Description of support units

- The EUT has been tested as an independent unit along with the following necessaryaccessories or support units, which are adopted to form a representative test configuration.

No	Equipment	Manufacturer	Model	S/N
-	-	-	-	-
-	-	-	-	-

5.3.2. Type of Used Cables

No	START		END		CABLE	
	NAME	I/O PORT	NAME	I/O PORT	LENGTH(m)	SHIELDED
-	-	-	-	-	-	-
-	-	-	-	-	-	-

6. Limite And Result

6.1 Radiated Electric Field Emissions

6.1.1 Regulation

According to §15.225(a), The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

6.1.2 Test Condition

- The EUT is placed on a turntable, which is 0.8m above ground plane.
- Three orientation for the EUT were tried to find out which orientation produces the worst emissions.
- The loop antenna was also moved around to find out worst position for the emissions.
- Set RBW of Spectrum analyzer to 9 kHz, VBW=300 kHz, Sweep=auto
- The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 uV/m at 30 meters.

6.1.3 Test result

Table 1 : Measured values of the Radiated Electric Field Emissions

Frequency (MHz)	Field Strength of Fundamental dBuV/m@ 3 m	Field Strength of Fundamental dBuV/m@ 30 m	Field Strength of Fundamental uV/m@ 30 m	Limit (uV/m)	Verdict
13.553-13.567	17.58	-22.42	0.076	< 15,848 uV/m @ 30 m	PASS

6.2 Radiated Electric Field Emissions

6.2.1 Regulation

According to §15.225(b), Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

According to §15.225(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

6.2.2 Test result

Table 2 : Measured values of the Radiated Electric Field Emissions

Frequency (MHz)	Field Strength of Fundamental dBuV/m@ 3 m	Field Strength of Fundamental dBuV/m@ 30 m	Field Strength of Fundamental uV/m@ 30 m	Limit (uV/m)	Verdict
13.410-13.553	4.46	-35.54	0.017	< 334 uV/m @ 30 m	PASS
13.567-13.710	11.32	-28.68	0.037		PASS
13.110-13.410	3.84	-36.16	0.016	< 106 uV/m @ 30 m	PASS
13.710-14.010	2.29	-37.71	0.013		PASS

6.3 Radiated Electric Field Emissions

6.3.1 Regulation

According to §15.225(d), The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

According to §15.209(a), for an intentional device, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705-30	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
Above 960	500	54.0	3

According to §15.109(a), for an unintentional device, except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the above table.

** The emission limits shown in the above table are based on measurement instrumentation employing a CISPR quasi-peak detector and above 1000 MHz are based on the average value of measured emissions.

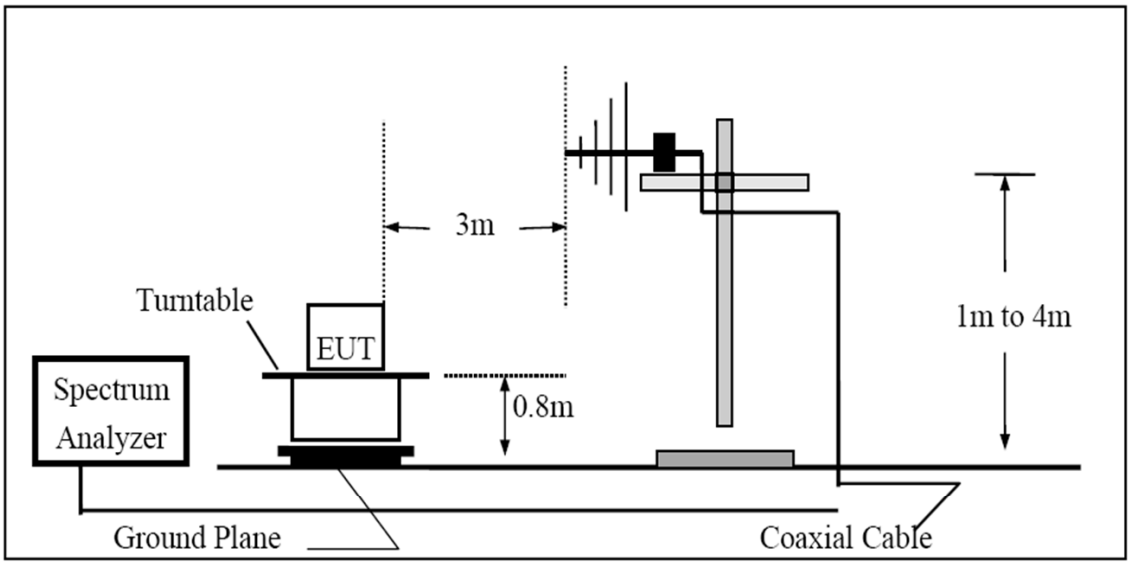
6.3.2 Test Procedure

1. The preliminary radiated measurements were performed to determine the frequency producing the maximum emissions in an anechoic chamber at a distance of 3 meters for above 30 MHz, and at 1 meter distance for below 30 MHz.
2. The EUT was placed on the top of the 0.8 meter height, 1 × 1.5 meter non-metallic table. To find the maximum emission levels, the height of a measuring antenna was changed and the turntable was rotated 360°.
3. The antenna polarization was also changed from vertical to horizontal. The spectrum was scanned from 9 kHz to 30 MHz using the loop antenna, from 30 to 1000 MHz using the Trilog broadband antenna, and from 1 GHz to tenth harmonic of the highest fundamental frequency using the horn antenna.
4. To obtain the final measurement data, the EUT was arranged on a turntable situated on a 4 × 4 meter at the Open Area Test Site. The EUT was tested at a distance 3 meters.

5. Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.
6. The EUT is situated in three orthogonal planes (if appropriate)
7. The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT.
8. If the emission on which a radiated measurement must be made is located at the edge of the authorized band of operation, then the alternative "marker-delta" method may be employed.

6.3.3 Test Setup Layout

6.3.3.1 Radiated Emission Test Set-Up, Frequency Below 1000MHz



6.3.3.2 Radiated Emission Test Set-UP Frequency Over 1000MHz

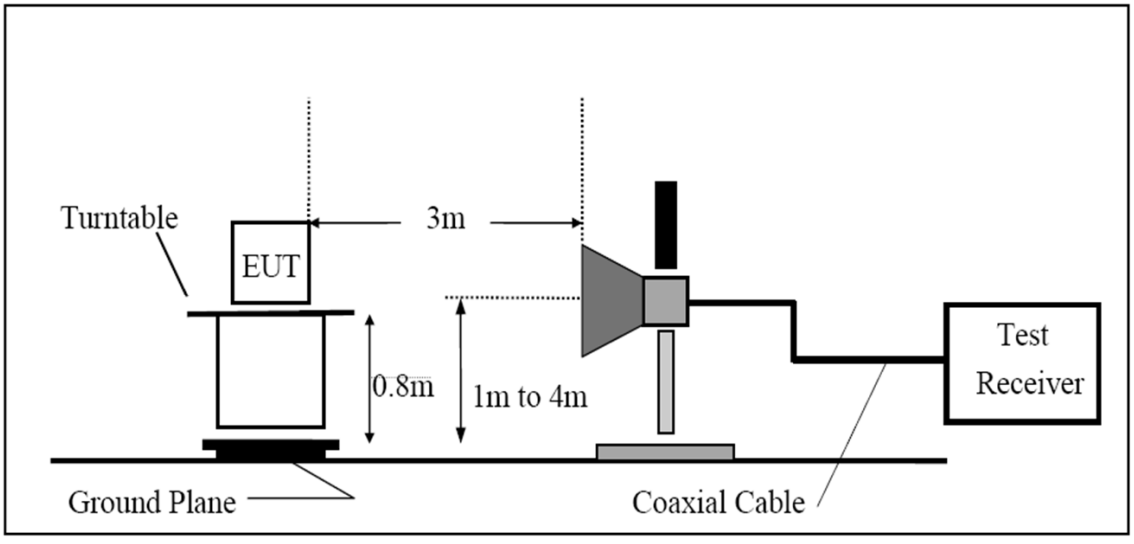


Table 3 : Measured values of theRadiated Electric Field Emissions						
Frequency (MHz)		**Detect Mode**	**Polarization (V/H)**	**Emission Level (dBμV/m)**	**Limit (dBμV/m)**	**Margin (dB)**
13.562	13.56	Quasi-peak	V	17.05	29.50	12.45
	16.35	Quasi-peak	V	10.27	29.50	19.23
	18.40	Quasi-peak	V	18.40	29.50	11.10
	63.12	Quasi-peak	V	36.64	40.00	3.36
	145.43	Quasi-peak	V	36.33	43.50	7.17
	163.08	Quasi-peak	H	34.49	43.50	9.01
	214.37	Quasi-peak	V	30.73	43.50	12.77
	699.04	Quasi-peak	H	37.37	46.00	8.63
	797.87	Quasi-peak	V	41.18	46.00	4.82
	1080.00	Peak	V	52.80	74.00	21.20
		Average		29.11	54.00	24.89
	1240.00	Peak	H	51.81	74.00	22.19
		Average		28.21	54.00	25.79
	1650.00	Peak	H	51.55	74.00	22.45
		Average		30.97	54.00	23.03
	1710.00	Peak	V	55.24	74.00	18.76
		Average		33.67	54.00	20.33
	1990.00	Peak	H	51.75	74.00	22.25
		Average		32.55	54.00	21.45
	2470.00	Peak	V	51.62	74.00	22.38
		Average		38.00	54.00	16.00
	3320.00	Peak	V	51.80	74.00	22.20
		Average		-	-	-

Note.

1. Margin (dB) = Limit – Emission Level
2. H = Horizontal, V = Vertical Polarization

6.4 Frequency Stability

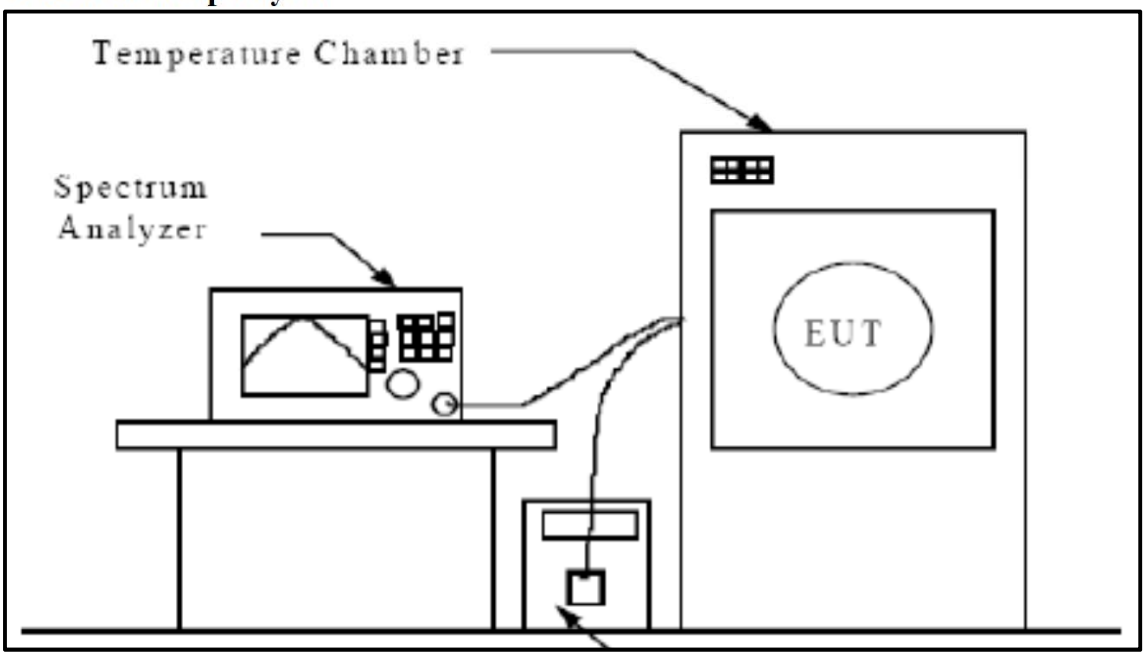
6.4.1 Regulation

According to §15.225(e), The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

6.4.2 Test Condition

1. Frequency stability vs. temperature measurement
   - The EUT was placed into the constant temperature chamber.
   - The spectrum analyzer was used to read the EUT operating frequency.
   - Set the constant temperature chamber temperature within the range of -20°C to +50°C
2. Frequency stability vs. input voltage measurement
   - The EUT was placed into the constant temperature chamber and set the temperature to 20°C.
   - The spectrum analyzer was used to read the EUT operating frequency.
   - The EUT is powered with the DC Power Supplied it with 85% and 115% voltage, and measured the EUT operating frequency.

6.4.3 Test Setup Layout



6.4.4 Test result

Table 4 : Measured values of the Frequency Stability

Frequency (Hz)	Test Data (Hz)				Limit (Hz)	Verdict
	-20°C	-10°C	0°C	+10°C		
13562000	13562108	13562176	13562246	13562253	± 1356 Hz (13560644 ~ 13563356)	PASS
	+20°C	+30°C	+40°C	+50°C		
	13562271	13562282	13562298	13562329		
	Test Voltage					
	Power 85%		Power 115%			
	13562281		13562281			

*Note

- Limit : Operating frequency X (±) 0.0001 = (±) 1356 Hz
- Within the band : 13560644 Hz - 13563356 Hz

6.5 AC Power Line Conducted Emissions

6.5.1 Regulation

According to §15.207(a), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Qausi-peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50

* Decreases with the logarithm of the frequency.

According to §15.107(a), for unintentional device, except for Class A digital devices, line conducted emission limits are the same as the above table.

6.5.2 Test Procedure

1. The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 cm in which is located 40 cm away from the vertical wall and 1.5m away from the side wall of the shielded room.
2. Each current-carrying conductor of the EUT power cord was individually connected through a 50Ω/50μH LISN, which is an input transducer to a Spectrum Analyzer or an EMI/Field Intensity Meter, to the input power source.
3. Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
4. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 MHz to 30 MHz.
5. The measurements were made with the detector set to PEAK amplitude within a bandwidth of 10 kHz or to QUASI-PEAK and AVERAGE within a bandwidth of 9 kHz. The EUT was in trans--mitting mode during the measurements.

6.5.3 Test Results

Table 5-1 : Measured values of the AC Power Line Conducted Emissions (DVD Rental Machine

Frequency (MHz)	Mode	Hot/Neutral (H/N)	Measured Value (dBμV)	Correction Factor (dB)	Cable Loss (dB)	Emission Level (dBμV)	Limit (dBμV)	Margin (dB)
0.17	Qausi-peak	H	54.17	0.05	0.04	54.26	79.00	24.74
	Average		38.75			38.84	66.00	27.16
0.20	Qausi-peak	H	53.98	0.05	0.04	54.07	79.00	24.93
	Average		31.63			31.72	66.00	34.28
0.22	Qausi-peak	H	53.82	0.05	0.04	53.91	79.00	25.09
	Average		33.02			33.11	66.00	32.89
0.27	Qausi-peak	H	43.08	0.05	0.05	43.18	79.00	35.82
	Average		29.87			29.97	66.00	36.03
0.28	Qausi-peak	H	38.88	0.05	0.05	38.98	79.00	40.02
	Average		27.91			28.01	66.00	37.99
4.01	Qausi-peak	N	46.11	0.08	0.25	46.44	73.00	26.56
	Average		44.92			45.25	60.00	14.75
6.36	Qausi-peak	H	38.75	0.11	0.35	39.21	73.00	33.79
	Average		36.74			37.20	60.00	22.80
6.83	Qausi-peak	N	34.16	0.11	0.36	34.63	73.00	38.37
	Average		31.76			32.23	60.00	27.77
19.20	Qausi-peak	N	25.76	0.25	0.60	26.61	73.00	46.39
	Average		24.39			25.24	60.00	34.76
24.53	Qausi-peak	N	26.74	0.35	0.70	27.79	73.00	45.21
	Average		24.35			25.40	60.00	34.60

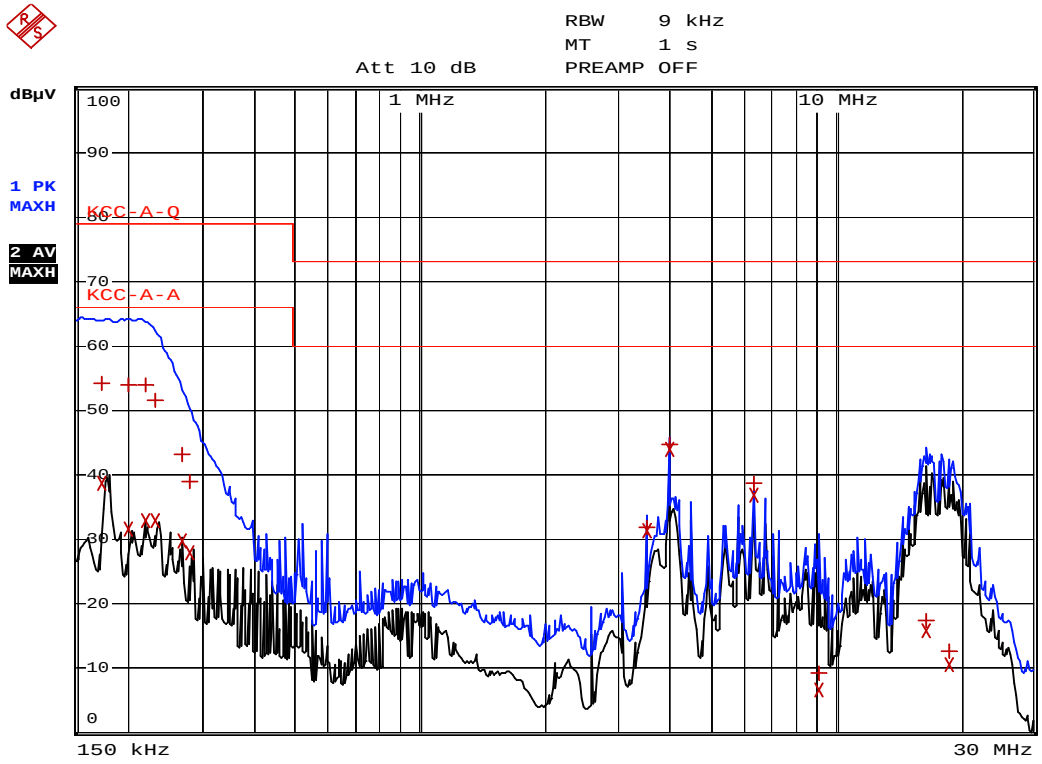
1. Margin (dB) = Limit – Emission Level
2. Emission Level = Measured Value + CF + CL

Table 5-2 : Measured values of the AC Power Line Conducted Emissions (Air conditioner)								
Frequency (MHz)	**Mode**	**Hot/Neutral (H/N)**	**Measured Value (dBμV)**	**Correction Factor (dB)**	**Cable Loss (dB)**	**Emission Level (dBμV)**	**Limit (dBμV)**	**Margin (dB)**
0.36	Qausi-peak	H	25.08	0.04	0.06	25.18	79.00	53.82
	Average		21.71			21.81	66.00	44.19
0.42	Qausi-peak	H	25.08	0.04	0.06	25.18	79.00	53.82
	Average		24.53			24.63	66.00	41.37
3.53	Qausi-peak	H	50.76	0.08	0.23	51.07	73.00	21.93
	Average		50.42			50.73	60.00	9.27
4.01	Qausi-peak	N	53.46	0.08	0.25	53.79	73.00	19.21
	Average		52.61			52.94	60.00	7.06
4.47	Qausi-peak	N	56.95	0.08	0.27	57.30	73.00	15.70
	Average		55.45			55.80	60.00	4.20
6.36	Qausi-peak	N	56.57	0.10	0.35	57.02	73.00	15.98
	Average		54.78			55.23	60.00	4.77
6.83	Qausi-peak	N	56.53	0.11	0.36	57.00	73.00	16.00
	Average		54.89			55.36	60.00	4.64
9.19	Qausi-peak	H	55.54	0.15	0.41	56.10	73.00	16.90
	Average		53.29			53.85	60.00	6.15
11.54	Qausi-peak	H	51.25	0.18	0.46	51.89	73.00	21.11
	Average		48.42			49.06	60.00	10.94
12.01	Qausi-peak	N	48.69	0.17	0.47	49.33	73.00	23.67
	Average		46.11			46.75	60.00	13.25

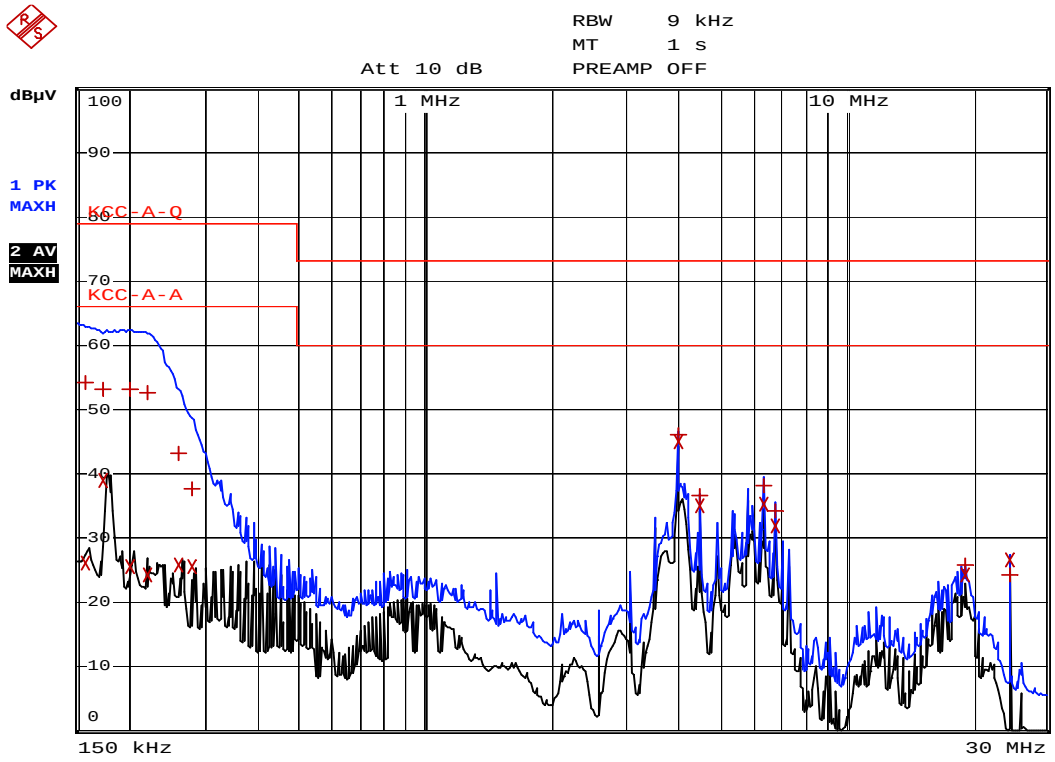
1. Margin (dB) = Limit – Emission Level
2. Emission Level = Measured Value + CF + CL

6.5.4 Plot of the AC Power Line Conducted Emissions
(DVD Rental Machine)

HOT LINE

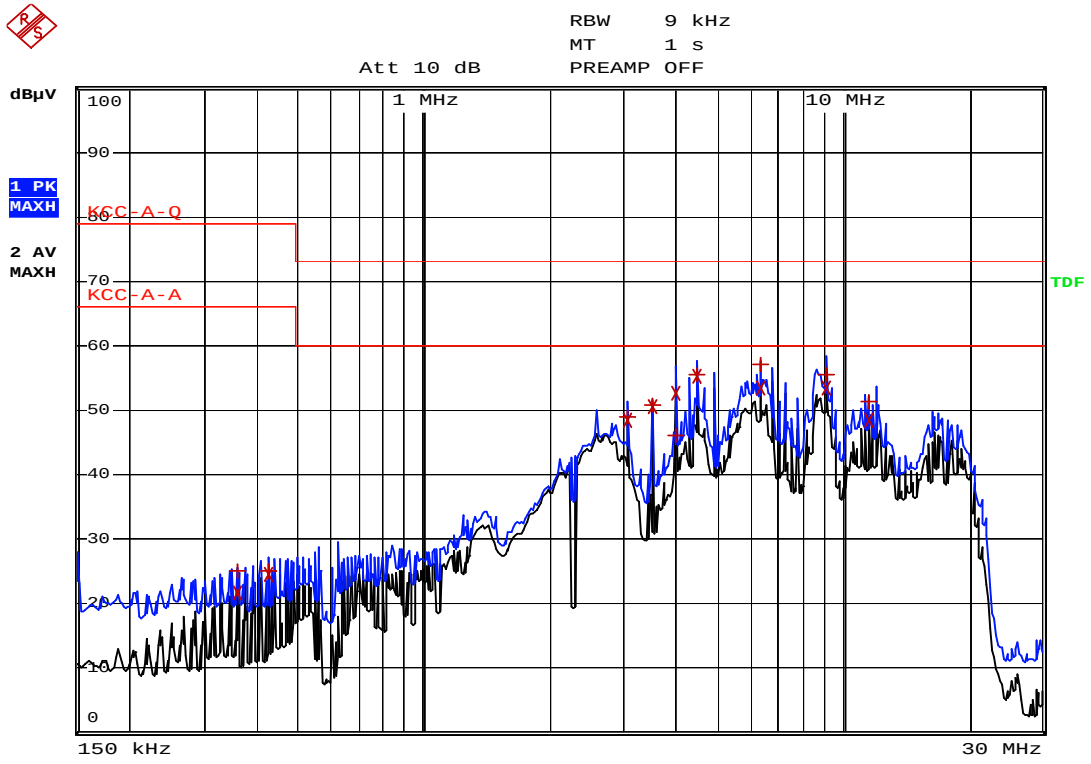


NEUTRAL LINE

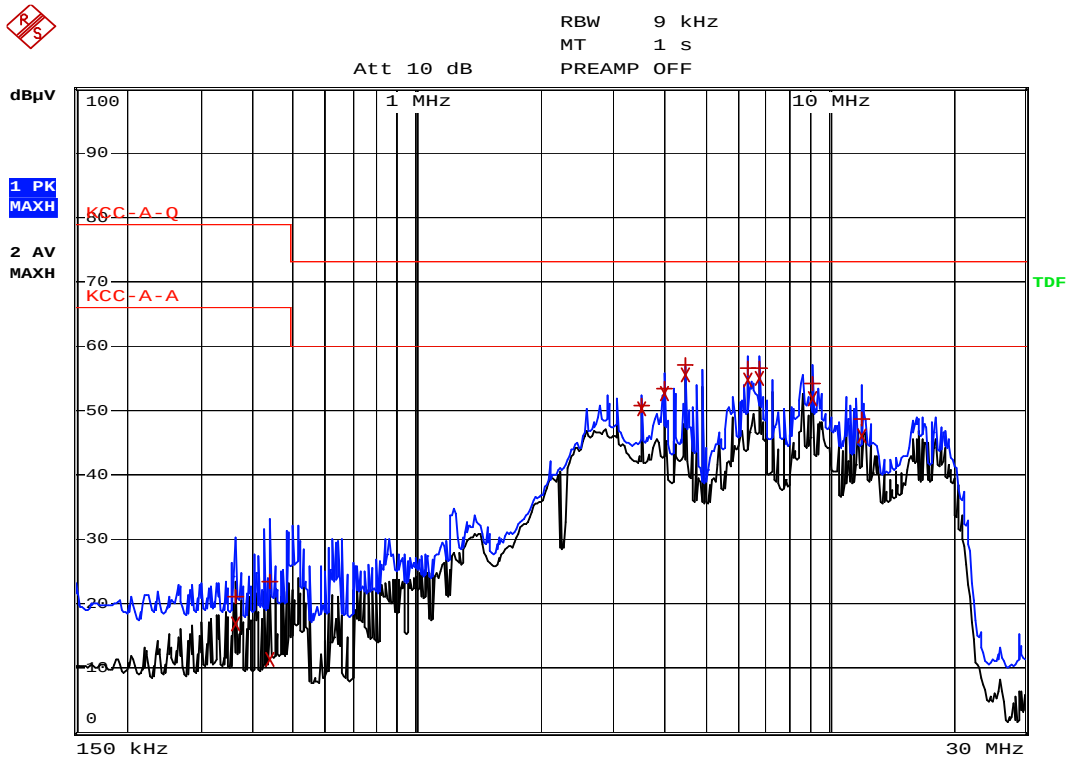


(Air conditioner)

HOT LINE



NEUTRAL LINE



7.Test Equipment Used For Test

Used equipment	Description	Manufacturer	Model Name	Serial Number	Specifications	Next Cal. Data
■	Spectrum Analyzer	ADVANTEST	R3273	101102518	100Hz ~ 26.5GHz	2012-10-13
■	MICROWAVE FREQUENCY COUNTER	ANRITSU	MF2414B	6200003197	10Hz ~ 26.5GHz	2012-10-04
□	EPM-P SERIES POWER METER	Agilent	E4416A	GB38272722	1CH 100-240VAC	2012-10-04
□	Power Sensor	Agilent	8481A	US41030240	MAX.23dBm AVG, 18GHz	2012-10-14
□	Signal Generator	ROHDE&SCHWARZ	SMIQ03B	832870/056	300kHz ~ 3.3GHz	2012-10-04
□	Signal Generator	AGILENT	83732B	US37101885	10MHz ~ 20GHz	2013-01-16
□	Modulation Analyzer	HP	8901B	3028A02980	150kHz-1.3GHz	2012-10-13
□	Audio Analyzer	HP	8903B	3729A17164	20Hz-100kHz	2012-10-04
□	Attenuator	Weinschel	41-6-12	21644	6dB, 10W	2012-10-13
□	Attenuator	Weinschel	41-10-12	13218	10dB, 10W	2012-10-13
□	Dual Directional Coupler	HP	778D	15923	20dB Coupler	2012-10-04
□	Dual Directional Coupler	AGILENT	11691D	1212A01281	18GHz 20dB	2013-02-29
□	BT SIMULATOR	TESCOM CO. LTD	TC-3000A	3000A4C0158	100-240VAC 50/60Hz 40W	2012-10-06
□	Power Divider	H.P	11636B	07317	DC-26.5GHz	2012-10-13
□	Power Divider	H.P	11636B	07412	DC-26.5GHz	2012-10-13
■	Test receiver	ROHDE&SCHWARZ	ESPI3	101171	9kHz~3GHz	2012-08-12
■	BI-LOG ANT	SCHWARZBECK	VULB9163	398	30MHz~1GHz	2013-10-03
■	Loop Antenna	EMCO	6502	9801-3191	9KHz~30MHz	2014-02-02
■	Horn antenna	Schwarzbeck	BBHA 9120D	769	1GHz ~ 18GHz	2013-03-22
■	Horn antenna	Schwarzbeck	BBHA 9120D	768	1GHz ~ 18GHz	2013-03-22
■	Spectrum Analyzer	ROHDE&SCHWARZ	FSPI3	100640	9kHz ~ 13.6GHz	2013-01-04
■	Amplifier	TESTEK	TS-PA2	120005	500MHz~18GHz	2013-03-01
□	DC Power Supply	ODA Tech	OPE-505S	oda-01-0923-03430	1CH 50V 5A	-
■	Slidacs	Daekwang	-	-	5KVA, OUTPUT:AC:0~300V	-
□	DC Power Supply	Maynuo	M8811	08001096001103046	30V 5A	2012-08-16
□	Digital Mutil Meter	UTI	DMSC 683A	06086830042	750V 10A	-
■	Digital Mutil Meter	FLUKE	8842A	5126272	1000V 2A	2012-08-11
□	Continuous operation tester	-	-	-	MAX 9990시간	2013-03-11
□	Vibration Tester	Gana	GNV-500	-	0~60Hz/50Kg	2012-10-04
■	HUMIDITY CHAMBER	BUM JIN Eng.	-	-	-40~120°C 95%	2012-09-16
□	Drop Tester	JUNG JIN Eng.	-	-	0-120Cm	-

8. EUT Photographs

8.1 Front view

8.2 Back view