

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B CERTIFICATION

Test Report No. : E063R-040

AGR No. : A062A-148

Applicant : SAROTECH CO., LTD.

Address : Sarotech Bldg. 320-15, Sungnae-Dong, Gangdong-Gu, Seoul, 134-851, Korea

Manufacturer : SAROTECH CO., LTD.

Address : Hanlim Venture Town #204, 689-6, Gumjeong-Dong, Gunpo-City, Kyungki-Do, Korea

Type of Equipment : Multimedia Player (Peripheral Device for Class B Computing Device)

FCC ID : PBCDVP-370

Model Name : DVP-370

Multiple Model Name : N/A

Serial number : N/A

Total page of Report : 14 pages (including this page)

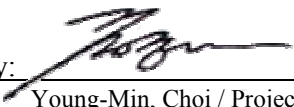
Date of Incoming : January 24, 2006

Date of Issuing : March 27, 2006

SUMMARY

The equipment complies with the requirements of **FCC CFR 47 PART 15 SUBPART B, Class B.**

This test report contains only the results of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

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EMC-002 (Rev.0)

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(TEL: +82-31-746-8500, FAX: +82-31-746-8700)

EMC Testing Dept : 307-51 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do, 464-860, Korea. (TEL: +82-31-765-8289, FAX: +82-31-766-2904)

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1. VERIFICATION OF COMPLIANCE

- APPLICANT : SAROTECH CO., LTD.
- ADDRESS : Sarotech Bldg. 320-15, Sungnae-Dong, Gangdong-Gu, Seoul, 134-851, Korea
- CONTACT PERSON : Mr. Yong-Woo, Lee / Manager
- TELEPHONE NO : +82-2-480-5140
- FCC ID : PBCDVP-370
- MODEL NAME : DVP-370
- SERIAL NUMBER : N/A
- DATE : March 27, 2006

DEVICE TYPE	Peripheral Device for Class B Computing Device - Unintentional Radiator
E.U.T. DESCRIPTION	Multimedia Player
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4: 2003
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15, SECTION 15.101
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	Yes
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

- The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. GENERAL INFORMATION

2.1 Product Description

The SAROTECH CO., LTD., Model DVP-370 (referred to as the EUT in this report) is a Multimedia Player that has a function for transmitting of FM broadcasting frequency range and PC peripheral. This report covers a PC peripheral and move playing functions. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Metal
LIST OF EACH OSC. or CRY. FREQ.(FREQ.>=1MHz)	12 MHz and 27 MHz
POWER REQUIREMENT	AC 95-240V, 50/60Hz, 0.5A
NUMBER OF LAYERS	1 Layer: Power Board, 2 Layers: Key Board and Sub Board, 4 Layers: Main Board
EXTERNAL CONNECTOR	AC In, DC In, Ext. IR In, USB, Video Composite Out, Video Component Out, Video S-Vide Out, Audio R/L Out, Optical Out, Coaxial Out, FM Ant.

2.2 Model Differences

-. The difference(s) compared to the EUT is as follows: None

2.3 Related Submittal(s) / Grant(s)

-. Original submittal only

2.4 Test System Details

The model numbers for all the equipments that were used in the tested system is:

Model	Manufacturer	FCC ID	Description	Connected to
DVP-370	SAROTECH CO., LTD.	PBCDVP-370	Multimedia Player (EUT)	Notebook PC
PP05LC	DELL COMPUTER CORP.	DoC	Notebook PC	-
2225C	HP	DSI6XU2225	Printer	Notebook PC
M4	Mouse Systems	N/A	Modem	Notebook PC
LT201CL	KTV	N/A	TV (For Movie Playing Mode)	EUT

2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 307-51 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do, 464-080, Korea. Description details of test facilities were submitted to the Commission on April 04, 2003. (Registration Number: 340658)

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3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	SAROTECH CO., LTD.	DVP-370 Main V1.01	N/A
Key Board	SAROTECH CO., LTD.	DVP-370A Key V1.0	N/A
Sub Board	N/A	Sub V1.0	N/A
Power Board	SEYANG TECH	SY0103RC Rev.A	N/A
HDD	Seagate	ST380011A	N/A

3.2 EUT exercise Software

The EUT has following 2 operating condition, so two modes were tested and each test results were recorded.

1. After connecting the EUT to a notebook PC using the USB cable, the data were continuously read and written from the personal computer to the EUT.
2. Movie file in the HDD of the EUT was played during the test.

3.3 Cable Description

Ports Name	Shielded	Ferrite Bead	Metal Hood	Length (m)	Connected to
Audio Out	N	N	BOTH END	1.5	-
Video Out	N	N	BOTH END	1.5	-
AC In	N	N	EUT END	1.2	-
USB	Y	Y	BOTH END	1.5	PC
FM Out	N	N	EUT END	1.2	-

3.5 Equipment Modifications

- The R7, 8, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24(key connector line) on the main board were changed to the bead(2000 ohm).
- The R12, 13(key connector line) on the main board were changed to the bead(1000 ohm).
- The bead(1000 ohm) was added to the R42(22ohm) that is U9 CLKE line on the main board.
- The bead(120 ohm) was added to the R34, 35(22ohm) that is U3 SYS FL line on the main board.
- The R37, 38, 39(U5 SYS line) were changed to the bead(1000 ohm) on the main board.
- The bypass capacitor(27pF) was added to the connector J6, pins 3~18, 21, 23, 25, 27, 29, 31 and 33~38 on the main board.
- The rating of bead(connector CON1 line, L30) was changed from 1000 ohm to 2000 ohm on the main board.
- The rating of bead(connector CON1 line, R36) was changed from 0 ohm to 1000 ohm on the main board.
- The L15, 17, 18(S-Video Socket line) were changed to the bead(2000 ohm) on the main board.
- The L7, 9, 11(RCA Socket line) were changed to the bead(2000 ohm) on the main board.

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- The B21, 22, 29(Connector J3 line, 0.1uF) were changed to the resistor(0 ohm) on the main board.
- The rating of bead(USB 5V line, L25) was changed from 1000 ohm to 2000 ohm on the main board.
- The CMF(90 ohm) was added to the USB D+/- line on the main board.
- The bead(Connector J7 line, D5, 6, 1000 ohm) were deleted on the main board.
- The bypass capacitor(0.01uF) was added to the connector J6, pins 1 and 39 on the main board.
- The D1, 2(Connector J2 line) were deleted on the main board.
- The rating of bead(VCC 3.3V line, L4, 31) was changed from 1000 ohm to 2000 ohm on the main board.
- The rating of bead(VCC line and AUDVCC line, L2, 3) was changed from 1000 ohm to 2000 ohm on the main board.
- The L27(USB GND line) was deleted on the main board.
- The L23, 24 were deleted on the main board.
- The analog GND was connected to the digital GND on the main board.
- The rating of bead(Connector JACK1 line, L1) was changed from 1000 ohm to 2000 ohm on the main board.
- The EMI gasket was added between the HDD and inside of top enclosure.
- The ferrite core(E-tech, SH2915C) was added to the key connector cable.
- The GND wire was connected to the GND of key board.

3.6 Configuration of Test System

Line Conducted Test : The EUT was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4: 2003 7.2.3 to determine the worse operating conditions.

Radiated Emission Test : Preliminary radiated emission test was conducted using the procedure in ANSI C63.4: 2003 8.3.1.1 to determine the worse operating conditions. Final radiated emission test was conducted at 3 meters open area test site.

4. PRELIMINARY TEST

4.1 AC Power line Conducted Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The operating condition
Data were continuously read and write by USB Port	X
Movie Playing Mode	X

4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The operating condition
Data were continuously read and write by USB Port	X
Movie Playing Mode	X

5. FINAL RESULT OF MEASUREMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level

5.1 Conducted Emission Test**5.1.1 Operating Condition: Data were continuously read and write by USB Port**

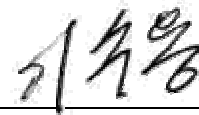
Humidity Level : 42 % Temperature: 21 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107 (a)
Type of Test : CLASS B
Result : PASSED BY -9.28 dB at 3.06 MHz under peak mode

EUT : Multimedia Player Date: March 14, 2006
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Peak (dBuV)		Margin (dB)
		Emission level	Q.P Limits	
0.68	H	42.11	56.00	-13.89
1.41	H	42.79	56.00	-13.21
3.02	N	45.65	56.00	-10.35
3.06	H	46.72	56.00	-9.28
20.45	N	48.28	60.00	-11.72
20.47	H	49.57	60.00	-10.43
Frequency (MHz)	Line	Average (dBuV)		Margin (dB)
		Emission level	Limits	
3.02	N	24.79	46.00	-21.21
3.06	H	27.16	46.00	-18.84
20.45	N	27.65	50.00	-22.35
20.47	H	27.91	50.00	-22.09

Line Conducted Emission Tabulated Data

Remark : "H": Hot Line, "N": Neutral line



Tested by: Sue-Young, Lee/ Test Engineer

5.1.2 Operating Condition: Movie Playing Mode

Humidity Level : 42 %

Temperature: 21 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107 (a)

Type of Test : CLASS B

Result : PASSED BY -8.82 dB at 2.99 MHz under peak mode

EUT : Multimedia Player

Date: March 14, 2006

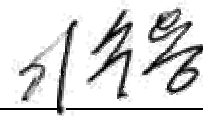
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Peak (dBuV)		Margin (dB)
		Emission level	Q.P Limits	
1.15	N	39.95	56.00	-16.05
1.27	H	42.24	56.00	-13.76
2.99	H	47.18	56.00	-8.82
3.02	N	44.71	56.00	-11.29
21.85	N	48.43	60.00	-11.57
22.65	H	49.02	60.00	-10.98
Frequency (MHz)	Line	Average (dBuV)		Margin (dB)
		Emission level	Limits	
2.99	H	30.60	46.00	-15.40
3.02	N	26.99	46.00	-19.01
21.85	N	30.12	50.00	-19.88
22.65	H	29.14	50.00	-20.86

Line Conducted Emission Tabulated Data

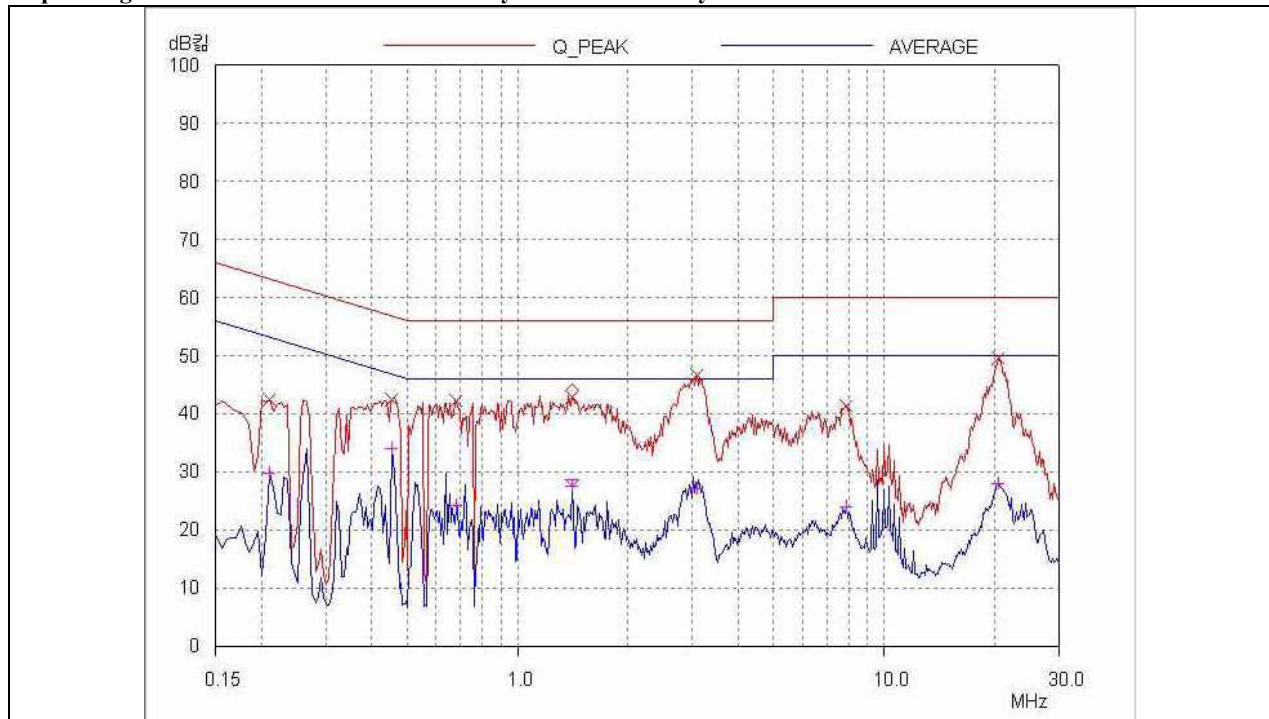
Remark : "H": Hot Line, "N": Neutral line

See next page for an overview sweep performed with peak and average detector.

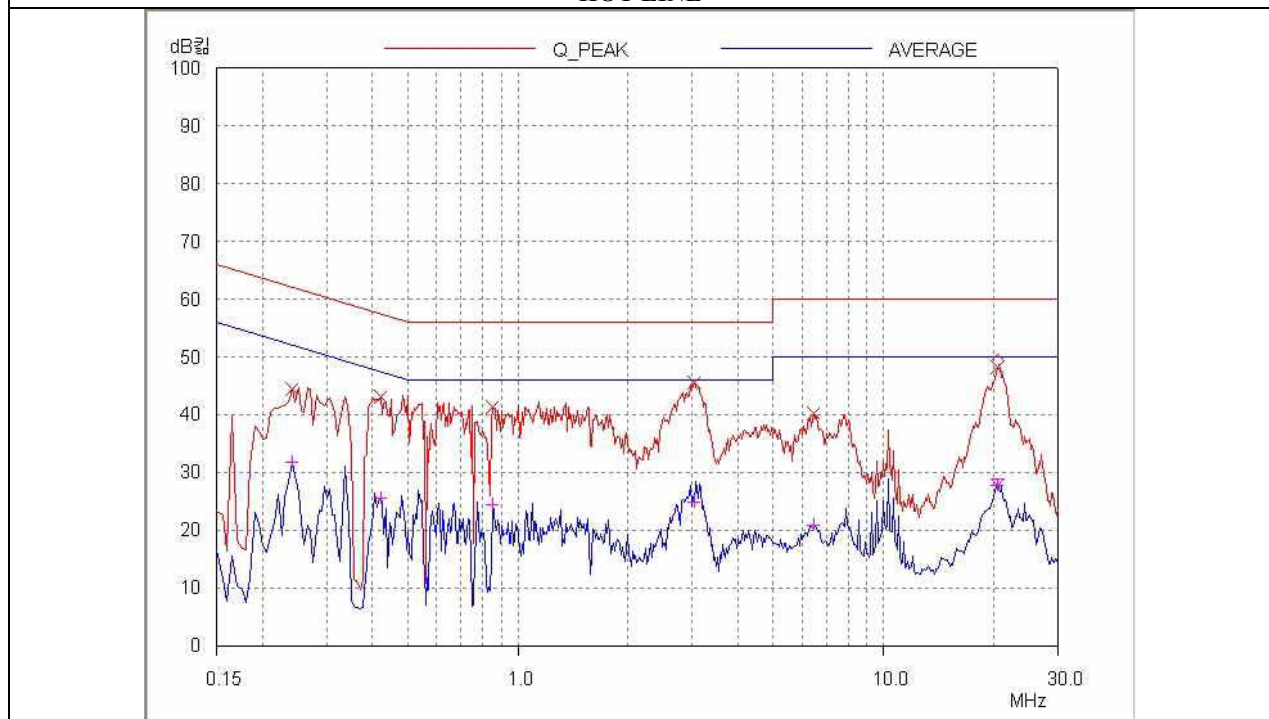


Tested by: Sue-Young, Lee/ Test Engineer

Operating Condition: Data were continuously read and write by USB Port



HOT LINE



NEUTRAL LINE

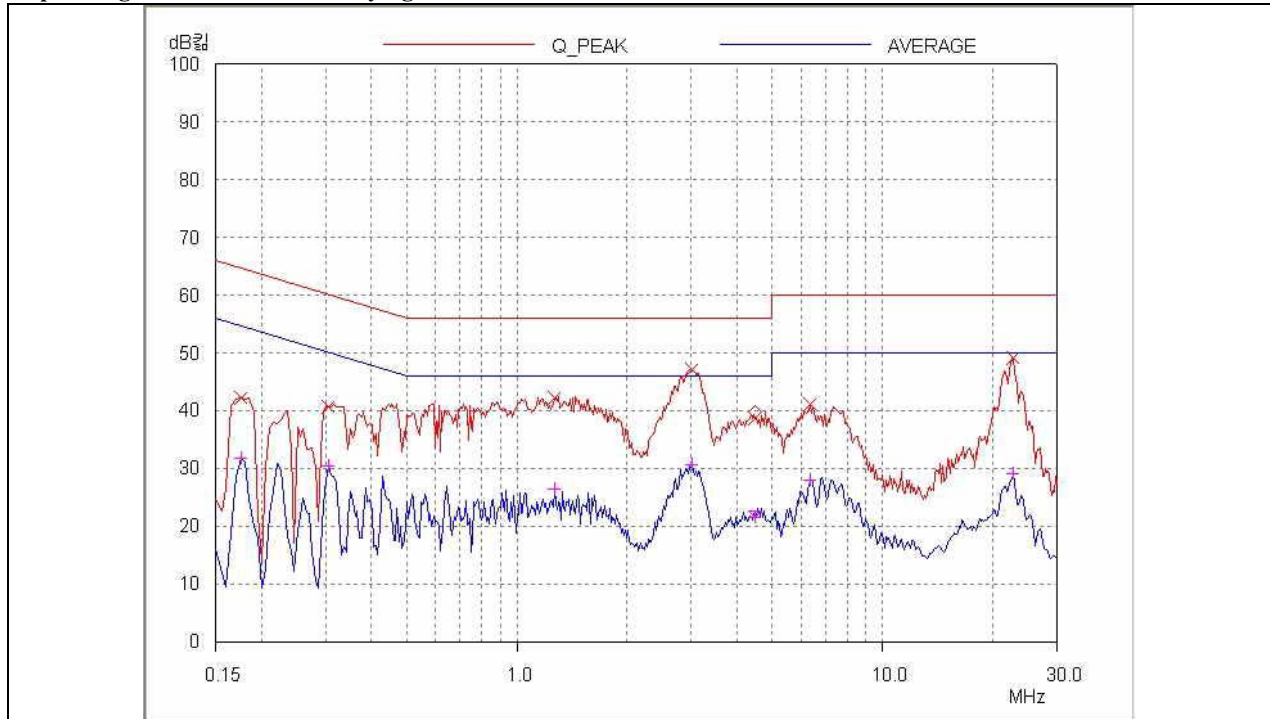
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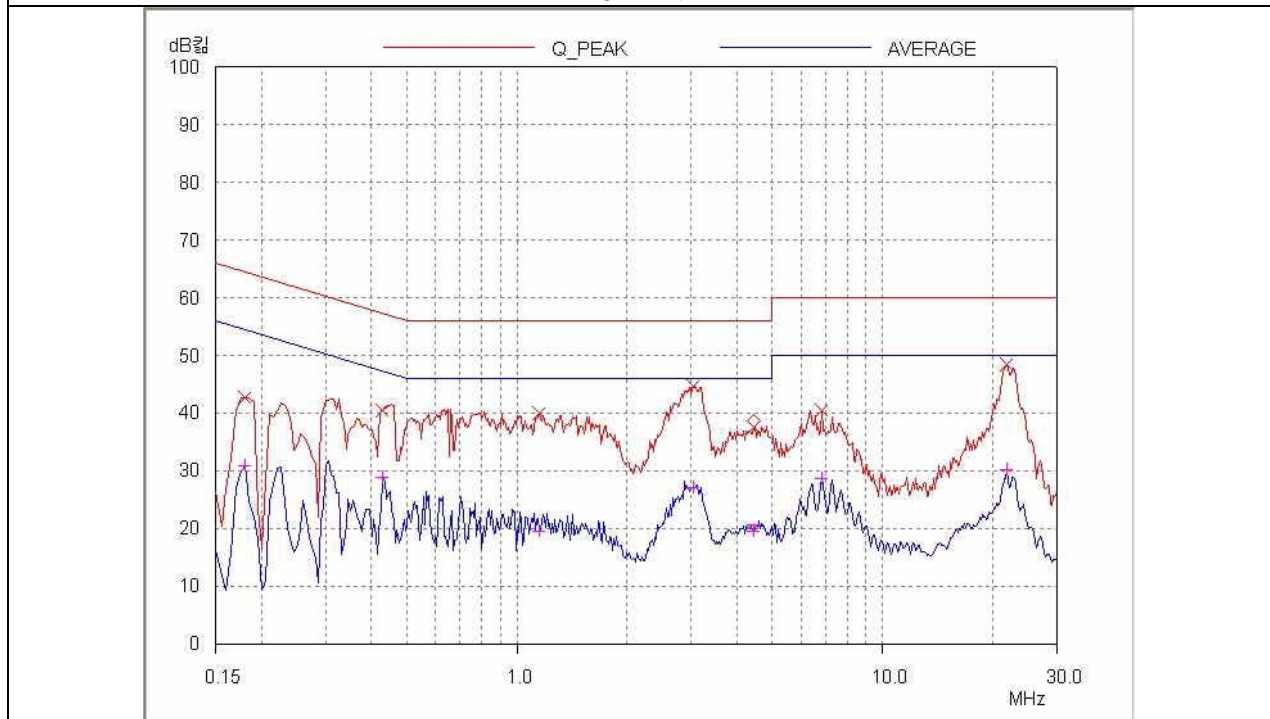
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Operating Condition: Movie Playing Mode



HOT LINE



NEUTRAL LINE

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5.2 Radiated Emission Test

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

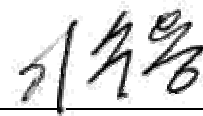
5.2.1 Operating Condition: Data were continuously read and write by USB Port

Humidity Level : 39 % Temperature: 17 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109 (a)
Type of Test : CLASS B
Result : PASSED BY -5.22 dB at 599.78 MHz

EUT : Multimedia Player Date: March 13, 2006
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
Frequency Range : 30 MHz – 1000 MHz
Distance : 3 Meter

Radiated Emissions		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
133.68	17.50	V	13.75	2.27	33.52	43.52	-10.00
149.19	18.00	H	14.59	2.31	34.90	43.52	-8.62
198.10	16.66	H	16.12	2.80	35.58	43.52	-7.94
299.39	16.47	H	20.04	3.79	40.30	46.02	-5.72
499.59	15.74	V	19.15	5.49	40.38	46.02	-5.64
599.78	15.43	V	20.07	5.30	40.80	46.02	-5.22

Radiated Emissions Tabulated Data



Tested by: Sue-Young, Lee/ Test Engineer

5.2.2 Operating Condition: Movie Playing Mode

Humidity Level : 39 % Temperature: 17 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109 (a)
 Type of Test : CLASS B
 Result : PASSED BY -4.39 dB at 299.39 MHz

EUT : Multimedia Player Date: March 13, 2006
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
 Frequency Range : 30 MHz – 1000 MHz
 Distance : 3 Meter

Radiated Emissions		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
80.39	22.95	V	6.44	1.71	31.10	40.00	-8.90
106.55	19.92	V	10.89	1.90	32.71	43.52	-10.81
183.10	15.76	V	15.64	2.80	34.20	43.52	-9.32
242.20	20.07	H	17.05	3.28	40.40	46.02	-5.62
299.39	17.80	H	20.04	3.79	41.63	46.02	-4.39
431.10	18.49	V	17.65	4.46	40.60	46.02	-5.42
566.84	15.17	V	19.73	5.30	40.20	46.02	-5.82

Radiated Emissions Tabulated Data



Tested by: Sue-Young, Lee/ Test Engineer

6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+ Meter reading (dBuV)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/meter)

= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)

7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS10	827864/005	DEC/05	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	MAY/05	12MONTH	■
3.	Spectrum analyzer	HP	8566B	3407A08547	JUL/05	12MONTH	
4.	Spectrum analyzer	HP	8568B	3109A05456	APR/05	12MONTH	■
5.	RF preselector	HP	85685A	3107A01264	APR/05	12MONTH	■
6.	Quasi-Peak Adapter	HP	8574B	2811A01432	APR/05	12MONTH	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163 166	APR/05	12MONTH	
8.	Biconical antenna	EMCO	3110	9003-1121	FEB/06	12MONTH	
		Schwarzbeck	VHA9103	91031852	FEB/06		■
9.	Log Periodic antenna	EMCO	3146	9001-2614	FEB/06	12MONTH	
		Schwarzbeck	9108-A(494)	62281001	FEB/06		■
10.	LISN	EMCO	3825/2	9109-1867	JUL/05	12MONTH	■
				9109-1869	JUL/05		
		Schwarzbeck	NSLK 8126	8126-404	AUG/05		■
11.	Position Controller	HD GmbH	HD100	N/A	N/A	N/A	■
12.	Turn Table	HD GmbH	DS420S	N/A	N/A	N/A	■
13.	Antenna Master	HD GmbH	MA240	N/A	N/A	N/A	■