ETL EMC LAB.

F C C M E A S U R E M E N T R E P O R T

Test report file No.	**ETL.00EEL11.003-F**	**Date of issue :**	**November 9, 2000**
Model / Type No.	**mpiko**		
Kind of product	**MP3 PLAYER**		
Original Applicant	**JUNG MYUNG TELECOM CO., LTD**		
Manufacturer	**JUNG MYUNG TELECOM CO., LTD**		
Address	**5FL Silla-Technovil, Dang-Dong, Koonpo-City, KOREA**		

Test result according to the regulation(s)

■ **Compliance** □ **Fail**

Report prepared by

ETL EMC Lab.
584, Sangwhal-Ri, Kanam-Myun, Yoju-Kun, Kyounggi-Do, KOREA
Tel : 82 - 31 - 885 – 0072/3 Fax : 82 - 31 - 885 - 0074

This test report with appendix consists of **18**pages. The test result only responds to the tested sample **(SN : N/A)**. It is not allowed to copy this report even partly without the allowance of the Test Laboratory.
This equipment as for has been shown to be capable of continued compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance

with the measurement procedures specified in **ANSI C63.4-1992 .**

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1. SUMMARY

GENERAL REMARKS:

The equipment is not modified anything, mechanical or circuit to improve EMI status during a measurement and complied the regulation "FCC Part 15 subpart B Class B of CFR 47".

FINAL JUDGMENT:

The requirements according to the technical regulations are

■ **- Kept** ☐ **- Not kept**

The equipment under test does

■ **- fulfill the general approval requirements of FCC Part 15 subpart B Class B of CFR 47 .**

☐ **- Not fulfill the general approval requirements.**

Begin of testing : November 1, 2000

End of testing : November 6, 2000

Reviewed by : **Approved by :**

CHON SIK ,KIM / EMC Engineer **Joo Min. Kim / Chip Manager**

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2. GENERAL DESCRIPTION

2.1 Test Facility

The open field test site and conducted measurement facility used to collect the radiated data are located 584, Sangwhal-Ri, Kanam-Myun, Yo ju-Kun, Kyounggi-Do, KOREA.
The site is constructed in conformance with the requirement of ANSI C63.4 and CISPR Publication 22. The detail description of test facility was submitted to the commission and accepted by commission.

2.2 Test Regulation

Both conducted and radiated emission testing were performed according to the procedures in ANSI C63.4/1992. The radistes emission testinf was performed at an antenna to EUT distance of 3 meters as described below.

2.3 Description of Test

2.3.1 Conducted Emissions:

Conducted emissions measurements were made in accordance with § 11 in ANSI C63.4-1992 "Measurement of Information Technology Equipment". The measurement were performed over the frequency range of 0.45MHz to 30MHz using a 50Ω/50uH LISN as the input transducer to a Spectrum Analyzer or a Field Intensity Meter. The measurements were made with the detector set for "Peak" amplitude within an bandwidth of 10KHz or for "quasi-peak" within a bandwidth of 9KHz.

- **Procedure of Test**

The line-conducted facility is located inside a shielded room 1m X 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 1.5m away from the side wall of the shielded room. Two EMCO 3825/2 LISN are bonded to the shielded room. The EUT is powered from the EMCO LISN and the support equipment is powered from the another EMCO LISN. Power to the LISNs are filtered by a noise cut power line filters. All electrical cables are shielded by braided tinned steel tubing with inner f 1.2cm. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the EMCO LISN. All interconnecting cables more than 1m were shortened by non-inductive bundling to a 1m length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the R3261A Spectrum Analyzer to determine the frequency producing the max. emission from the EUT. The frequency producing the max. level was reexamined using to set Quasi-Peak mode by manual, after scanned by automatic Peak mode from 0.45 to 30MHz. The bandwidth of the Spectrum Alalyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission.

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2.3.2 Radiated Emissions:

Radiated emissionmeasurements were in accordance with § 11 in ANSI C63.4-1992 "Measurement of Information Technology Equipment". The measurements were performed over the frequency range of 30MHz to 1GHz using antenna as the input transducer to a Spectrum analyzer or a Field Intensity Meter. The measurements were made with the detector set for "Quasi-peak" within a bandwidth of 120KHz.

- **Procedure of Test**

Preliminary measurements were made at 3 meter using broadband antennas, and spectrum analyzer to determint the frequency producing the max. emission in shielded rome. Appropriate precaution was taken to ensure that all emission from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth and height with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 to 1000MHz using SchwarzBeck Log-Bicon antenna. Above 1GHz, linearly polarized double ridge horn antennas were used. Final measurements were made open site at 3-meters. The test equipment was placed on a wooden turn-table. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined by manual. The detector function was set to CISPR Quasi-peak mode and the bandwidth of the receiver was set to 120kHz or 1MHz depending on the frequency of type of signal. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the max. emission for the frequency and were placed on top of a 0.8-meter high nonmetallic 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the max. emission. Each emission was maximized by: varying the mode of operation to the EUT and/or support equipment and changing the polarity of the antenna, whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in Test Setup photos.

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2.4 Test Conditions

The measurement the conducted emissions (interference voltage) was performed in a shielded room.

Test location :

■ - **Shielded room** ☐ - **Compact chamber 2**

Used testing instruments : *(Model/manufacturer/Type/Serial No./Cal Due Date)*

■ - **R3261A**	**Advantest**	**Spectrum Analyzer**	**21720033**	**Oct. 21. 2001**
☐ - **ESVS 10**	**Rohde & Schwarz**	**Receiver**	**835165/001**	

Test - accessories :

■ - **3825/2**	**EMCO**	**LISN**	**9208-1995**	**Sep. 03. 2001**
☐ - **3825/2**	**EMCO**	**LISN**	**9006-1669**	**Sep. 03. 2001**
☐ - **11947A**	**H.P**	**Transient Lmiter**	**42-00643**	
☐ - **KNW-407**	**Kyoriteu**	**LISN**	**91-ILN-12**	
☐ - **ESH 3-Z5**	**R & S**	**LISN**	**91-ILN-07**	

The measurement of the radiated emissions(electric field) in the frequency range of 30 MHz ~ 1000MHz was performed in horizontal and vertical antenna polarization at a non-reflecting

open-site and a test distance of:

■ - **Open-site** ☐ - **Anechoic Chamber**
■ - **3 meters** ☐ - **10 meters**

Used testing instruments :

■ - **R3261A**	**Advantest**	**Spectrum Analyzer**	**21720033**	**Oct. 21. 2001**
■ - **ESVS 10**	**R & S**	**Receiver**	**835165/001**	**Mar. 06. 2001**
■ - **8447D**	**H.P**	**Amplifier**	**2944A06873**	**Sep. 07. 2001**

Test - accessories :

■ - **VULB 9160**	**Schwarzbeck**	**Log-Bicon Antenna**	**3082**	**May. 08. 2001**
■ - **VULB 9165**	**Schwarzbeck**	**Log-Bicon Antenna**	**2023**	**May. 08. 2001**
■ - **VHAP**	**Schwarzbeck**	**Dipole Antenna**	**964, 965**	**May. 03. 2001**
■ - **UHAP**	**Schwarzbeck**	**Dipole Antenna**	**949, 950**	**May. 03. 2001**
■ - **3-3122**	**Isuzu**	**Thermo Hygrograph**	**3312201**	**Dec. 20. 2000**
■ -	**Regulus**	**Barometer**	**-**	**-**

All used test-instruments as well as the test-accessories are calibrated regularly.

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2.5 Product (Equipment Under Test) Information

The Equipment Under Test(EUT) is the Jung Myung Telecom CO.,LTD.
Flash USB Drive, MODEL: FUD

- **Flash Memory : built-in 16M/32M/64M/128M**
- **Smart Media Card : External 16M/32M/64M**
- **Battery : DC 1.5V X 2EA(AAA Type)**
- **Playing Time : 8Hours**
- **Size : 64 X 75 X 29mm**
- **Weight : 54g(Except Battery)**
- **Interface Port : USB Cable**
- **Frequency Range : 20Hz ~ 20KHz**
- **LIST OF EACH OSC. OR XTAL.FREQ. : XTAL – 8MHz, 14,725MHz**

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3. SYSTEM TEST CONFIGURATION

The device was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the following conditions and configurations were used.

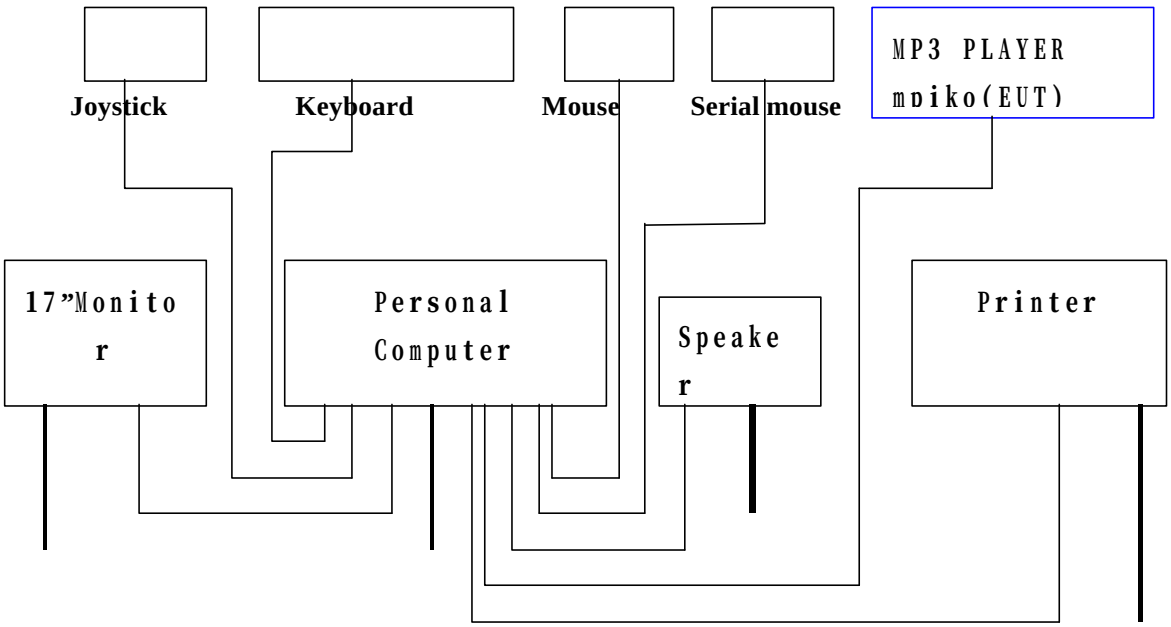
3.1 EUT exercise equipment

The EUT exercise equipment used during the radiated and conducted testing was designated to exercise the various system components in a manner similar to a typical use.

3.2 Configuration of test system

-. Line Conducted Test : EUT was connected to LISN , all other supporting equipment were connected to another LISN. Preliminary power line conducted emission tests were performed by using the procedure in ANSI C63.4/1992 Clause 7.2.3 to determine the worst operating conditions.

-. Radiated Emission Test : Preliminary radiated emission tests were conducted using the procedure in ANSI C63.4/1992 Clause 8.3.1.1 to dertimine the worst operating condition. Final radiated emission tests were conducted at 3 meter open field test site.



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3.3 Tested System Details

Following peripheral devices and interface cables were connected during the measurement:

Support Unit 1 - Personal computer (DELL)

FCC ID	**: N/A (DoC)**
Model Name	**: MMP**
Serial No.	**: 2LL11S**
Manufacturer	**: DELL**
Power Supply Type	**: Switching**
Power Cord	**: Non-Shielded, Detachable, 1.2m**
Port	**: Parral: 1, USB: 2, Keyboard: 1, Mouse: 1, RS-232: 2**

EUT – MP3 PLAYER

FCC ID	**: N/A**
Model Name	**: mpiko**
Serial No.	**: N/A**
Manufacturer	**: Jung Myung Telecom Co., Ltd.**
Power Supply Type	**: Supply from USB port of PC**
Power Cord	**: N/A**
Data Cable	**: Shielded USB Cable**

Support Unit 2 - Monitor (HYUNDAI)

FCC ID	**: CKLHL-7682B**
Model Name	**: HL-7682B**
Serial No.	**: N/A**
Manufacturer	**: HYUNDAI Electronics Industies Co.,Ltd**
Power Supply Type	**: Switching**
Power Cord	**: Non-Shielded, Detachable, 1.2m**
Data Cable	**: Shielded detacheable 15-pin D-sub and ferrite core on signal cable**

Support Unit 3 - Keyboard (DELL)

FCC ID	**: N/A(DOC)**
Model Name	**: SK-8000**
Serial No.	**: 2965**
Manufacturer	**: DELL**
Power Supply Type	**: N/A**
Power Cord	**: N/A**
Data Cable	**: Shielded, 1.2m**

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Support Unit 4 - MOUSE (LOGITECH)

FCC ID	**: DZL211029**
Model Name	**: M-S34**
Serial No.	**: LZC01002314**
Manufacturer	**: LOGITECH**
Power Supply Type	**: N/A**
Power Cord	**: N/A**
Data Cable	**: Shielded, 1.2m**

Support Unit 5 - SPEAKER (PC BANK)

FCC ID	**: N/A**
Model Name	**: N/A**
Serial No.	**: N/A**
Manufacturer	**: PC BANK**
Power Supply Type	**: Linear**
Power Cord	**: Non-Shielded, Un-Detachable, 1.0m**
Data Cable	**: Audio Cable, 0.5m**

Support Unit 6 – Serial Mouse (PETRA)

FCC ID	**: JKGMUS5S01**
Model Name	**: MUS5S**
Serial No.	**: E183027**
Manufacturer	**: PETRA**
Power Supply Type	**: N/A**
Power Cord	**: N/A**
Data Cable	**: Un-Shielded, 1.2m**

Support Unit 7 – Printer (H.P)

FCC ID	**: B94C2164X**
Model Name	**: C4562B**
Serial No.	**: TH9411434G**
Manufacturer	**: H.P**
Power Supply Type	**: DC24V From Adapter (C2182A/H.P)**
Power Cord	**: Non-Shielded**
Data Cable	**: Shielded, 1.5m**

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4. Preliminary Tests

4.1 AC Power line Conducted Emission Tests

During Preliminary tests, MP3 Player was Operate from USB port of PC

4.2 Radiated Emission Tests

During Preliminary tests, MP3 Player was Operate from USB port of PC

4.3 Operation mode of the E.U.T.:

The equipment under test was operated during the measurement under following conditions:

☐ **- Standby**

■ **- MP3 PLAY**

☐ **- Others**

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5. FINAL CONDUCTED AND RADIATED EMISSION TESTS SUMMARY

5.1 TEST RESULT SUMMARY

Conducted emissions 450 kHz ~ 30MHz

■ **- Pass**

The requirements are.

	■ - Kept	□ - Not kept
Min. limit margin.	**-4.30 dB**	**at 1.074 MHz**

Remarks: **See the test-data & graphs to be attached .**

Radiated emissions (electric field) 30 MHz ~ 1000 MHz

■ **- Pass**

The requirements are.

	■ - Kept	□ - Not kept
Min. limit margin.	**-4.56dB**	**At 63.032 MHz**

Remarks: **See the test to be attached.**

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5.2 Conducted Emission Test Data

EUT Type	**MP3 PLAYER**
Limit apply to	**FCC Part15 Subpart B**
Type of Tests	**CLASS B**
Manufacturer	**Jung Myung Telecom CO., LTD**
Operation Condition	**MP3 PLAY**
	Humidity Level : 45%, Temperature : 24℃
Date	**November 3, 2000**

Line Conducted Emission Tabulated Data

The followinf table shows the highest levels of conducted emissions on both polarization of live and neutral line.

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

Frequency [MHz]	Reading [dBμV]	Phase (*L/**N)	Limit [dBμV]	Margin [dB]
	Quasi-peak		Quasi-peak	Q.Peak
0.681	41.85	N	48.00	-6.15
0.749	43.12	N	48.00	-4.88
0.968	43.57	L	48.00	-4.43
1.074	43.70	N	48.00	-4.30
5.502	39.67	N	48.00	-8.33
7.492	39.85	N	48.00	-8.15
15.85	38.22	N	48.00	-9.78
19.29	27.25	N	48.00	-20.75
20.02	29.55	N	48.00	-18.45
23.61	27.25	N	48.00	-20.75
All frequencies had been –4.3dB margin at least.				

NOTE : * L: Live Line , ** N: Neutral Line

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Tested by : Chon Sik, KIM / Test Engineer
ETL EMC Lab.

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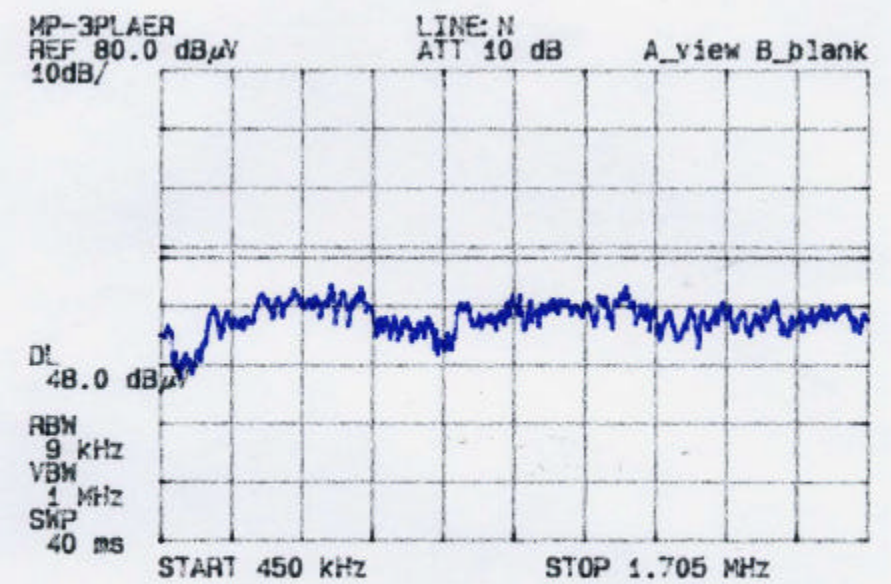
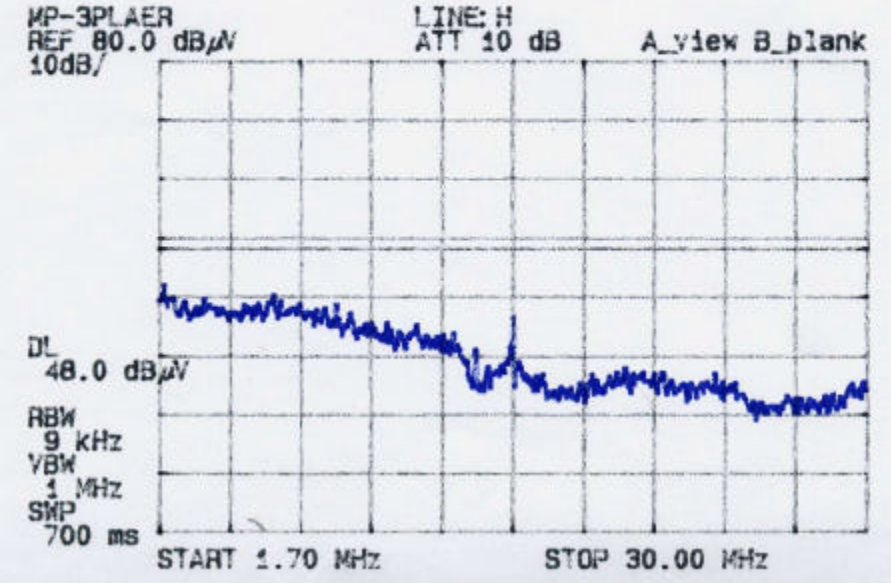
LINE POLARIZATION : HOT





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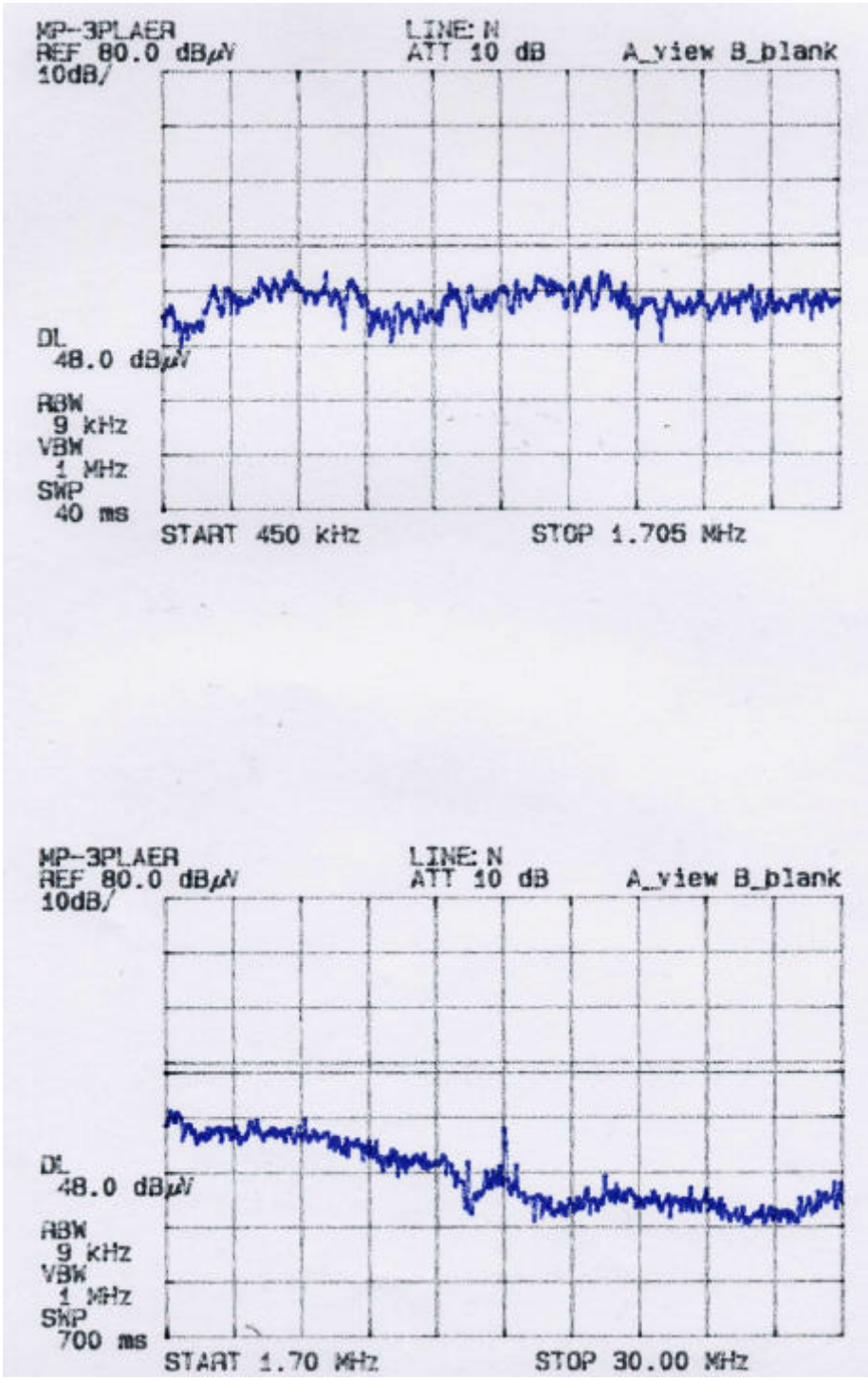
LINE POLARIZATION : NEUTRAL



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5.3 Radiated Emission Test Data

EUT Type	MP3 PLAYER
Limit apply to	FCC Part 15 Subpart B
Type of Tests	CLASS B
Manufacturer	JUNG MYUNG TELETOM CO.,LTD.
Operation Condition	MP3 PLAY
	Humidity Level : 46%, Temperature : 28℃
Date	November 9, 2000

Radiated Emission Tabulated Data

The following table shows the highest levels of radiated emissions on both polarization of horizontal and vertical.

Detector mode : FCC Quasi-Peak mode (6dB Bandwidth : 120 kHz)

Frequency [MHz]	Reading [DbμV]	Polarization (*H/**V)	Ant. Factor [dB]	Cable Loss [dB]	Result [dBμV/m]	Limit [dB]	Margin [dB]
31.520	16.18	V	13.12	0.98	30.28	40.0	-9.72
47.276	15.73	V	12.49	1.30	29.52	40.0	-10.48
55.155	18.73	V	11.88	1.37	31.98	40.0	-8.02
63.032	23.38	V	10.55	1.51	35.44	40.0	-4.56
70.920	21.44	V	9.83	1.57	32.84	40.0	-7.16
110.606	12.41	H	10.37	1.96	24.74	43.5	-18.76
236.340	7.20	H	10.69	2.96	20.85	46.0	-25.15
252.096	6.75	V	11.38	3.08	21.21	46.0	-24.79
267.852	5.75	H	12.00	3.18	20.93	46.0	-25.07
299.364	7.00	H	12.77	3.38	23.15	46.0	-22.85
315.120	6.50	V	13.18	3.52	23.20	46.0	-22.80
346.634	7.24	H	13.94	3.65	24.83	46.0	-21.17

Remarks : * H : Horizontal polarization , ** V : Vertical polarization
Result value = Reading + Antenna factor + Cable loss
Margine value = Limit - Result value

Tested by : Chon Sik, KIM / Test Engineer
ETL EMC Lab.

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6. Field Strength Calculation

dBuV = 20 log (uV/m)

dBuV = dBm + 107

Example 1 :

@ 1.074 MHz

Class B Limit = 250 uV = 47.96 dBuV

Reading = 43.70 dBuV

Convert to uV = 153.11 uV

$10^{(42.3/20)}$

Margin = 43.70 – 47.96 = -4.26

= 4.26dB below Limit

Example 2 :

@ 63.032 MHz

Class B Limit = 100 uV = 40.0 dBuV/m

Reading = 23.38 dBuV

Antenna Factor + Cable Loss = 12.06 dB

Total = 35.44dBuV/m

Margin = 35.44 – 40.0 = -4.56

= 4.56 dB below Limit

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7. List of Test Equipments

No.	Equipments	Manufacturer	Model	Serial No.	Cal Due Date	Remarks
1	Spectrum Analyzer	Advantest	R3261A	21720033	' 01.10.18	
2	Receiver	R&S	ESVS 10	835165/001	' 01.04.06	
3	Log-Bicon Antenna	Schwarzbeck	VULB9160	3082	' 01.05.08	
4	Log-Bicon Antenna	Schwarzbeck	VULB9165	2023	' 01.05.08	
5	Dipole Antenna	Schwarzbeck	VHAP	964,965	' 01.05.03	
6	Dipole Antenna	Schwarzbeck	UHAP	949,950	' 01.05.03	
7	LISN	EMCO	3825/2	9208-1995	' 01.09.03	
8	LISN	EMCO	3825/2	90061669	' 01.09.03	
9	RF Amplifier	H.P	8447		' 01.09.03	
10	Plotter	H.P	7440A	2725A 75722	N/A	
11	Turn-Table	Daeil EMC	DETT-03	--	N/A	
12	Antenna Master	Daeil EMC	DEAM-03	--	N/A	
13	Shielded room	Daetong	DTSR01	-	N/A	

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