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.00EEL11.005-F**	**Date of issue :**	**Nov. 23. 2000**
Kind of product	**Flash USB Drive**		
FCC ID	**PESFMD**		
Model / Type No.	**PESFMD-W**		
FCC Rule Part(s)	**Part 15 SubpartB**		
Original Applicant	**Jung Myung Telecom Co., Ltd.**		
Address	**5FL Silla-Technovil, 39-3, Dang-Dong, Koonpo-City, KOREA**		
Manufacturer	**Jung Myung Telecom Co., Ltd.**		
Address	**5FL Silla-Technovil, 39-3, Dang-Dong, Koonpo-City, KOREA**		

Test result according to the regulation(s)

■ **Compliance** □ **Fail**

Report prepared by

E-RAE Testing Laboratory Inc
EMC Testing and Engineering Services
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 **24** 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**.

TABLE OF CONTENTS

E-RAE Testing Laboratory, Inc.
HEAD Office : 371-51, Gasan-Dong, Geumcheon-Gu, Seoul ,153-023, Korea Tel : +82-2-858-0786 Fax: +82-2-858-0788

1. SUMMARY

GENERAL REMARKS:

The equipment is not modified anything, mechanical or circuits 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 20, 2000

End of testing : November 22, 2000

Reviewed by : **Approved by :**

Chon Sik.KIM / EMC Engineer **Joo Min. Kim / Chip Manager**

E-RAE Testing Laboratory, Inc.
HEAD Office : 371-51, Gasan-Dong, Geumcheon-Gu, Seoul ,153-023, Korea Tel : +82-2-858-0786 Fax: +82-2-858-0788

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, Yoju-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 radiated emission testing 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 0.15MHz 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 these supply lines will be connected to the EMCO LISN. Non-inductive bundling to a 1m length shortened all interconnecting cables more than 1m. 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 Analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission.

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.

E-RAE Testing Laboratory, Inc.
HEAD Office : 371-51, Gasan-Dong, Geumcheon-Gu, Seoul ,153-023, Korea Tel : +82-2-858-0786 Fax: +82-2-858-0788

- **Procedure of Test**

Preliminary measurements were made at 3 meter using broadband antennas, and spectrum analyzer to determined the frequency producing the max. emission in shielded room. 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.

E-RAE Testing Laboratory, Inc.
HEAD Office : 371-51, Gasan-Dong, Geumcheon-Gu, Seoul ,153-023, Korea Tel : +82-2-858-0786 Fax: +82-2-858-0788

2.4 Test Conditions

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

Test Location :

■ - **Shielded Room** □ - **Compact Chamber**

The measurement of the radiated emissions(electric gield) in the frequency range of 30 MHz ~ 1000 MHz was performed in horizontal and vertical polarization.

Open site and a test distance of :

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

2.5 Product (Equipment Under Test) Information

The Equipment Under Test(EUT) is the Jung Myung Telecom Co., Ltd.
Flash USB Drive, Model: FMD

- Chassis Type	:PLASTIC
-. List of Each OSC. Or X-Tal. Freq.(>=1MHz)	: X-TAL : 8MHz
-. Chipset Brand&Part NO.	: TMCG88AI – SAMSUNG : SST39VF512 – SAMSUNG : T3351FL – TRUMPION
-. Power Consumption	: USB bus-powered 4.5V ~ 5.5V
-. Number of Layers	: Main Board – 1 Layers
-. Memory Capacity	: 16MB/ 32MB/ 64MB/ 128MB/ 256MB/ 512MB/ 1GB
-. Suspend Current	: <300uA, compliant to USB Spec. of <500uA
-. Operating Current	: <40Ma
-. Dimension	: 89mm X 20mm X 10mm(16~64MB)
-. Weight	: 40g
-. Operating System	: Windows98&98se, Windows me, Windows 2000
-. PC System with USB Ports	: IBM PC/AT & Notebook & Sub-Notebook

E-RAE Testing Laboratory, Inc.
HEAD Office : 371-51, Gasan-Dong, Geumcheon-Gu, Seoul ,153-023, Korea Tel : +82-2-858-0786 Fax: +82-2-858-0788

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.

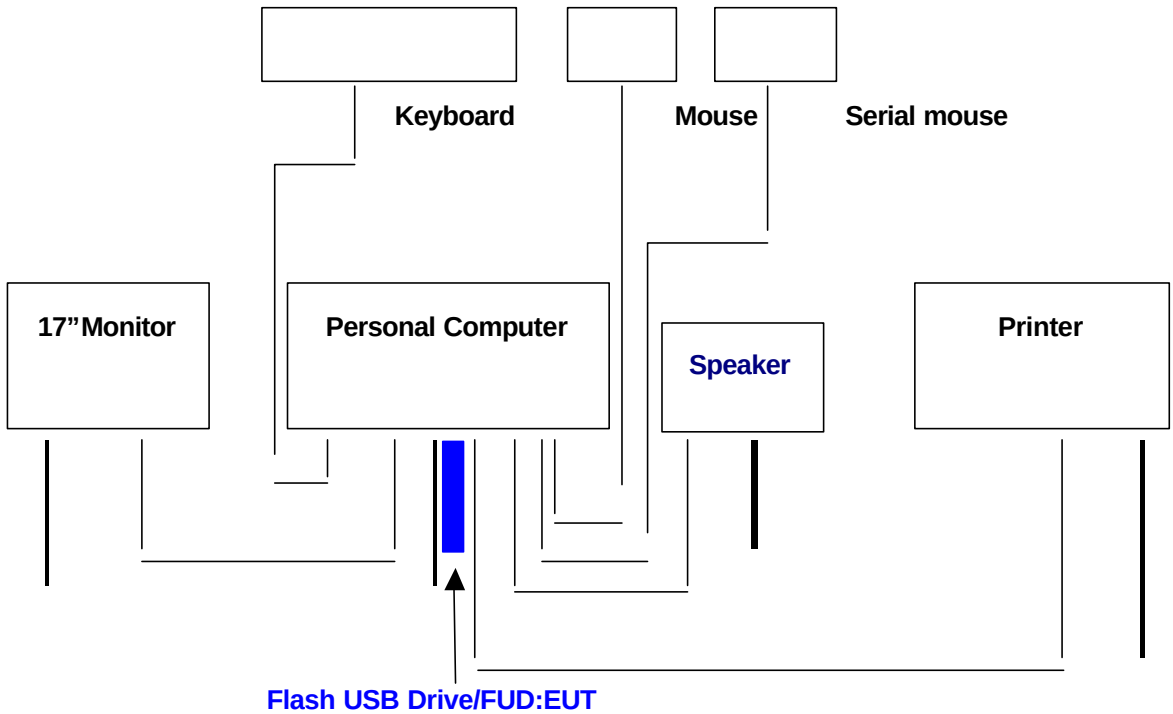
3.2 Configuration of test system

3.2.1 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.

3.2.2 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 10 meter open field test site.



E-RAE Testing Laboratory, Inc.
HEAD Office : 371-51, Gasan-Dong, Geumcheon-Gu, Seoul ,153-023, Korea
Tel : +82-2-858-0786 Fax: +82-2-858-0788

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 – Flash USB Drive

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	**: N/A**

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**

E-RAE Testing Laboratory, Inc.
HEAD Office : 371-51, Gasan-Dong, Geumcheon-Gu, Seoul ,153-023, Korea
Tel : +82-2-858-0786 Fax: +82-2-858-0788

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**

E-RAE Testing Laboratory, Inc.
HEAD Office : 371-51, Gasan-Dong, Geumcheon-Gu, Seoul ,153-023, Korea
Tel : +82-2-858-0786 Fax: +82-2-858-0788

4. Preliminary Tests

4.1 AC Power line Conducted Emission Tests

During Preliminary Tests, the following operating mode was investigated.

Operating Mode	The Worst operating condition
Download	
Play MP3 File	X

4.2 Radiated Emission Tests

During Preliminary Tests, the following operating mode was investigated.

.

Operating Mode	The Worst operating condition
Download	
Play MP3 File	X

5. FINAL TESTS SUMMARY

5.1 TEST RESULT SUMMARY

Conducted emissions 150 kHz ~ 30MHz

■ - Pass

The requirements are.	■ - Kept	□ - Not kept
Min. limit margin.	-13.63 dB	at 0.155 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.	-4.22dB	At 216.08 MHz

Remarks: See the test data to be attached.

E-RAE Testing Laboratory, Inc.
HEAD Office : 371-51, Gasan-Dong, Geumcheon-Gu, Seoul ,153-023, Korea
Tel : +82-2-858-0786 Fax: +82-2-858-0788

5.2 Conducted Emission Test Data

EUT Type	Flash USB Drive/FMD(S/N:N/A)
Limit apply to	CISPR 22
Type of Tests	CLASS B
Manufacturer	Jung Myung Telecom Co., Ltd.
Operation Condition	MP3 PLAY
	Humidity Level : 35%, Temperature : 19 ℃
Date	Nov 21, 2000

Line Conducted Emission Tabulated Data

The following 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)

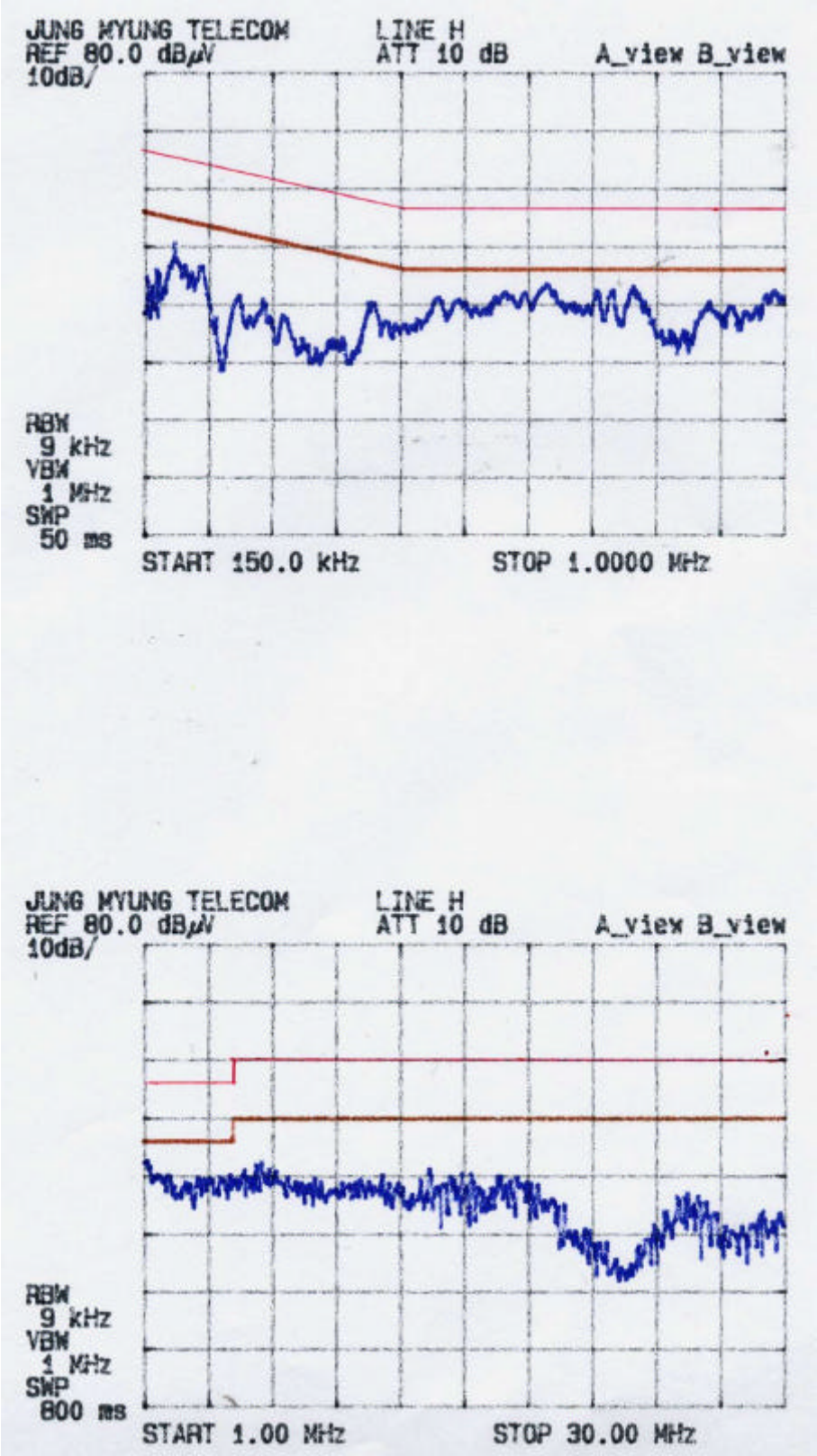
Frequency [MHz]	Reading [dBμV]		Phase (*L/**N)	Limit [dBμV]		Margin [dB]	
	Quasi-peak	Average		Quasi-peak	Average	Q.Peak	Average
0.155	52.07	33.45	N	65.7	55.7	-13.63	-22.25
0.190	48.75	31.58	L	64.0	54.0	-15.25	-22.42
0.243	44.77	30.05	N	61.9	51.9	-17.13	-21.85
0.686	42.20	30.18	L	56.0	46.0	-13.80	-15.82
4.451	39.54	17.97	N	56.0	46.0	-16.46	-28.03
6.210	42.50	31.64	N	60.0	50.0	-17.50	-18.36
15.460	42.25	26.99	N	60.0	50.0	-17.75	-23.01
23.700	41.30	26.96	N	60.0	50.0	-18.70	-23.04
All frequencies had been –13.63 dB margin at least.							

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

Tested by : Chon Sik .KIM / Test Engineer

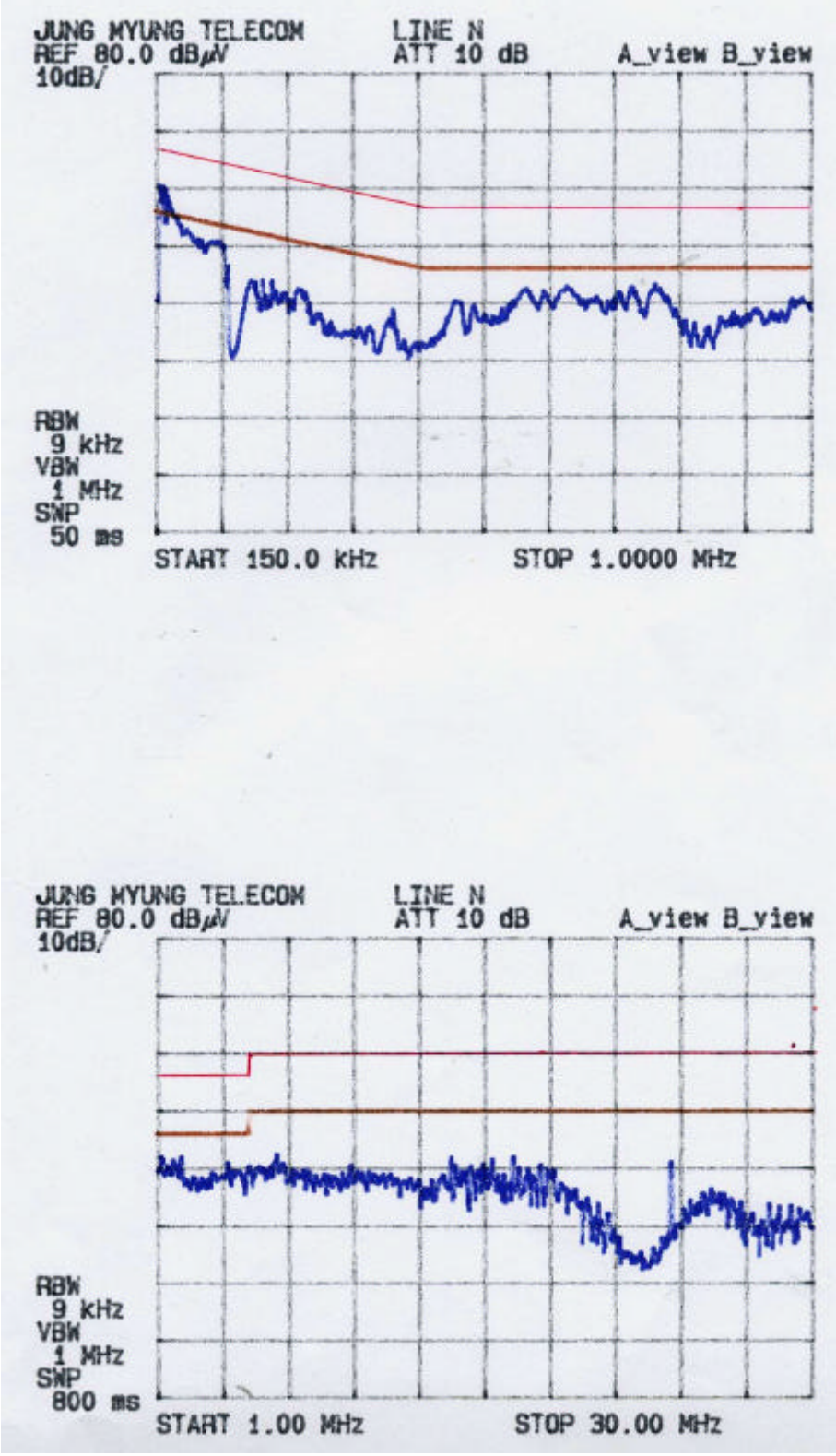
E-RAE Testing Laboratory, Inc.
HEAD Office : 371-51, Gasan-Dong, Geumcheon-Gu, Seoul ,153-023, Korea Tel : +82-2-858-0786 Fax: +82-2-858-0788

Line Polarization : Hot



E-RAE Testing Laboratory, Inc.
HEAD Office : 371-51, Gasan-Dong, Geumcheon-Gu, Seoul ,153-023, Korea
Tel : +82-2-858-0786 Fax: +82-2-858-0788

Line Polarization : Neutral



E-RAE Testing Laboratory, Inc.
HEAD Office : 371-51, Gasan-Dong, Geumcheon-Gu, Seoul ,153-023, Korea
Tel : +82-2-858-0786 Fax: +82-2-858-0788

5.3 Radiated Emission Test Data

EUT Type	**Flash USB Drive/ FUD(SN:N/A)**
Limit apply to	**CISPR 22**
Type of Tests	**CLASS B**
Manufacturer	**Jung Myung Telecom Co., Ltd.**
Operation Condition	**MP3 PLAY**
	Humidity Level : 35%, Temperature : 19 ℃
Date	**Nov 22, 2000**

Radiated Emission Tabulated Data

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

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

Frequency [MHz]	Reading [dBμV]	Polarization (*H/**V)	Ant. Factor [dB]	Cable Loss [Db]	Result [dBμV/m]	Limit [dBuV]	Margin [dB]
48.00	10.61	V	13.02	1.22	24.85	30.0	-5.15
72.09	8.25	V	9.83	1.57	19.65	30.0	-10.35
144.12	3.67	H	12.37	2.22	18.26	30.0	-11.74
176.22	12.16	H	11.50	2.53	26.19	30.0	-3.81
192.10	12.92	H	9.93	2.65	25.50	30.0	-4.50
216.08	13.73	H	9.37	2.68	25.78	30.0	-4.22
240.21	10.07	H	10.69	2.96	23.72	37.0	-13.28
264.00	10.64	H	11.63	3.15	25.42	37.0	-11.58
276.05	11.04	H	12.00	3.18	26.22	37.0	-10.78
288.00	17.21	H	12.21	3.25	32.67	37.0	-4.33
312.32	10.60	H	12.77	3.38	26.75	37.0	-10.25
360.14	13.94	H	13.94	3.65	31.53	37.0	-5.47
All frequencies had been –4.22 dB margin at least.							

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

Tested by : Chon Sik .KIM / Test Engineer

E-RAE Testing Laboratory, Inc.
HEAD Office : 371-51, Gasan-Dong, Geumcheon-Gu, Seoul ,153-023, Korea Tel : +82-2-858-0786 Fax: +82-2-858-0788

6. Field Strength Calculation

dBuV = 20 log (uV/m)

dBuV = dBm + 107

Example 1 :

@ 0.155 MHz

Class B Limit = 1940uV = 65.71 dBuV

Reading = 52.07 dBuV

Convert to uV = 401.5 uV

$10^{(42.3/20)}$

Margin = 52.07 – 65.71 = -13.64

= 13.64 dB below Limit

Example 2 :

@ 216.08 MHz

Class B Limit = 32.00 uV = 30.102 dBuV/m

Reading = 13.73 dBuV

Antenna Factor + Cable Loss = 12.05 dB

Total = 25.78 dBuV/m

Margin = 25.78 – 30.102 = -4.322

= 4.322 dB below Limit

E-RAE Testing Laboratory, Inc.
HEAD Office : 371-51, Gasan-Dong, Geumcheon-Gu, Seoul ,153-023, Korea Tel : +82-2-858-0786 Fax: +82-2-858-0788

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	Conical Log-spiral Antenna	Eaton	93491-2	340	'01.02.15	
6	Dipole Antenna	Schwarzbeck	VHAP	964,965	'01.05.03	
7	Dipole Antenna	Schwarzbeck	UHAP	949,950	'01.05.03	
8	LISN	EMCO	3825/2	9208-1995	'01.09.03	
9	LISN	EMCO	3825/2	90061669	'01.09.03	
10	RF Amplifier	H.P	8447		'01.09.03	
11	Plotter	H.P	7440A	2725A 75722	N/A	
12	Turn-Table	Daeil EMC	DETT-03	--	N/A	
13	Antenna Master	Daeil EMC	DEAM-03	--	N/A	
14	Shielded room	Daetong	DTSR01	-	N/A	

E-RAE Testing Laboratory, Inc.
HEAD Office : 371-51, Gasan-Dong, Geumcheon-Gu, Seoul ,153-023, Korea
Tel : +82-2-858-0786 Fax: +82-2-858-0788