

# Certification of Compliance

## CFR 47 Part 15 Subpart B

Test Report File No. : 06-IST-0271

Date of Issue : June 16, 2006

**Model(s)** : EZAV-T4  
**Kind of Product** : Digital Audio Player  
**FCC ID** : TTQEZAV-T4  
**Applicant** : EZAV Co., Ltd.  
**Address** : B-806, Woolim-lionsvalley, 371-28, Gasan-dong,  
Geumcheon-gu, Seoul, Korea  
**Manufacturer** : EZAV Co., Ltd.  
**Address** : B-806, Woolim-lionsvalley, 371-28, Gasan-dong,  
Geumcheon-gu, Seoul, Korea

### Test Result

☒ Positive

☐ Negative

Reviewed By

Approved By



S.J.CHO / EMC Group Manager



J.H.LEE / Chief

### Comment (s)

- Investigations requested : Measurement to the relevant clauses of FCC rules and regulations Part 15 Subpart B - Unintentional Radiators, Class B.
- The test report with appendix consists of 25 pages.
- The test result only responds to the tested sample.
- It is not allowed to copy this report even partly without the allowance of IST EMC 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 2004.



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### ■ Test Conditions and Data - Emissions

◆ Conducted Emissions	0.15MHz - 30MHz	Applicable	
Test Conditions / Data and Plots			10-12
◆ Radiated Emissions	30MHz - 1GHz	Applicable	
Test Conditions / Data and Plots			13-19

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Note:

## INFORMATIONS OF TEST LABORATORY

EMC LABORATORY of IST Co., Ltd. (**FCC Filing Lab.**)

80, Jeil-Ri, Yangji-Myun, Yongin-City

Kyonggi-Do, 449-860, Korea

TEL : +82 31 333 9018

FAX : +82 31 333 9019

## ENVIRONMENTAL CONDITIONS

Temperature 25 °C

Humidity 43 %

Atmospheric pressure 1013 mbar

## POWER SUPPLY SYSTEM USED

Power supply system AC 120Vac, 60Hz

(Refer to the product information)

## PRODUCT INFORMATION

**The Equipment Under Test(EUT) is Digital Audio Player EZAV Co.,Ltd.**

**(FCC ID : TTQEZAV-T4)**

AUDIO	File Support	MPEG 1/2/2.5/3 Layer3, WMA, OGG
	Channel	Stereo
	Frequency Range	20Hz~20KHz
	Earphone Output	20mW(L)+20mW:16Ω , Maximum Volume
	S/N Ratio	Over 90dB(With 20KHz LPF)
FM Radio	Frequency Range	87.5MHz~108MHz(Korea/USA/Europe) 76MHz~108MHz(Japan)
	Earphone Output	20mW(L)+20mW:16Ω , Maximum Volume
	S/N Ratio	Over 55dB(With 20KHz LPF)
	Receiver Type	Earphone Cord Antenna
Record	Voice recording time	256MB(Up to 36hours(16kbps))
		512MB(Up to 72hours(16kbps))
Format	Decode Format	MP3, WMA, OGG
	Encode Format	MP3
PC Interface	System OS	Windows98/ME/2000/XP/MAC OS(Over 9.0)
Power Supply	Rechargeable Li-ION Battery	
Dimension	35(L) x 68(H) x 16(T) (mm)	
Weights	about 42g(battery excluded)	

- EMC suppression device is not used during the test.
- Please refer to user's manual.

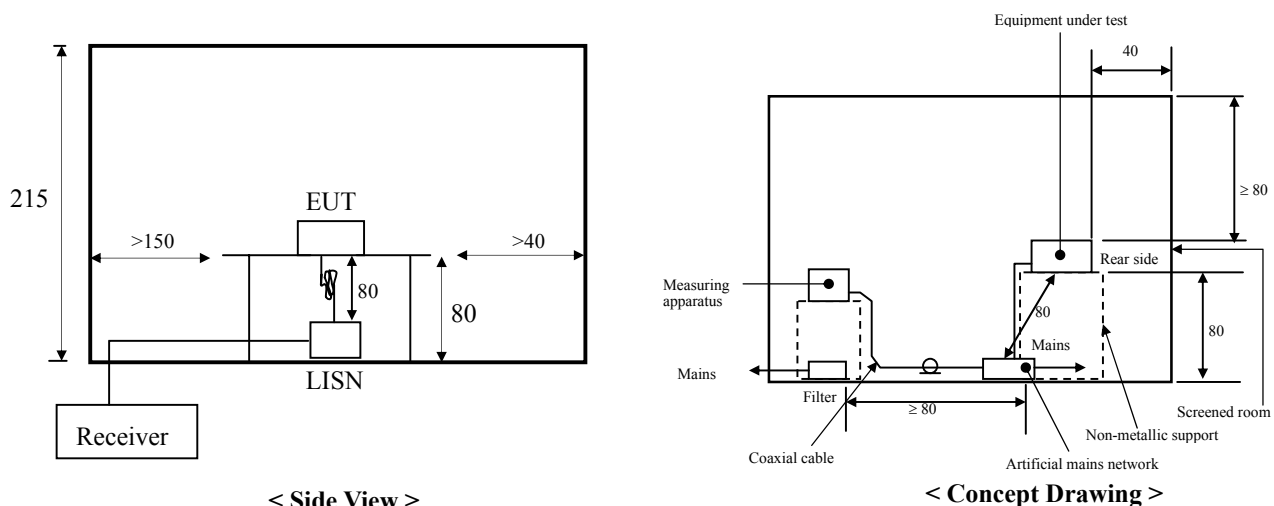
## DESCRIPTIONS OF TEST

### Conducted Emissions:

The measurement were performed over the frequency range of 0.15MHz to 30MHz using a ESH2-Z5 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 a bandwidth of 10KHz or for "quasi-peak" & "Average" within a bandwidth of 9KHz.

#### -Procedure of Test

The line-conducted facility is located inside a shielded room No.1. A 1m X 1.5m wooden table 80cm height is placed 40cm away from the vertical wall and 1.5m away from the other wall of the shielded room. The ESCS30 and ESH2-Z5 LISN are bonded to bottom of the shielded room. The EUT is located on the wooden table with distance more than 80cm from the LISN and powered from the ESH2-Z5 LISN .The peripheral equipment is powered from the other 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  $\phi$  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 ESH2-Z5 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 conditions. The RF output of the LISN was connected to the ESCS30 receiver to determine the frequency producing the maximum emission from the EUT. The frequency producing the maximum level was reexamined using Quasi-Peak mode by manual measurement, after scanned by automatic Peak mode for frequency range from 0.15 to 30MHz. The bandwidth of the receiver was set to 10kHz. The EUT, peripheral equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.



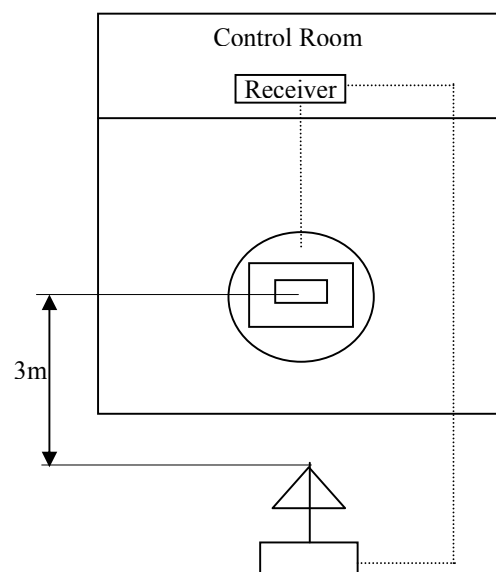
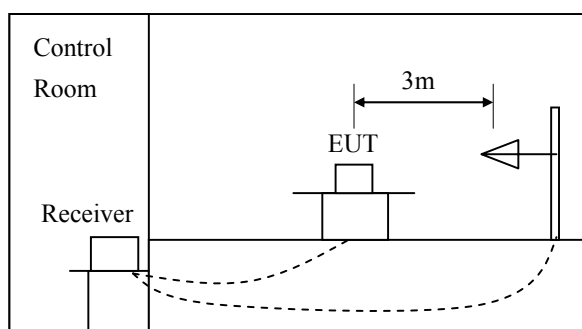
## DESCRIPTION OF TEST

### Radiated Emissions:

The measurement was 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 measurement was made with the detector set for "quasi-peak" within a bandwidth of 120KHz.

#### -Procedure of Test

Preliminary measurements were made at 3 meter using bi-log antennas, and spectrum analyzer to determine the frequency producing the max. emission in anechoic chamber. Appropriate precaution was taken to ensure that all emission from the EUT were maximized and investigated. The system configuration, mode of operation, turn-table azimuth and height with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30MHz to 1000MHz using bi-log antenna. Above 1GHz, linearly polarized double ridge horn antennas were used. Final measurements were made at open site with 3-meters test distance using bi-log antenna or horn antenna. The OATS have been verified in regular for its normalized site attenuation. The test equipment was placed on a wooden table. Sufficient time for the EUT, peripheral 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, peripheral 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, peripheral 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 maximum emission. Each emission was maximized by: varying the mode of operation to the EUT and/or peripheral equipment and changing the polarity of the antenna, whichever determined the worst-case emission.



## Measurement Uncertainty Calculations

The measurement uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 and NIS 81 (1994).

Contribution (Conducted Emissions)	Probability Distribution	Uncertainty ( $\pm$ dB)
		0.15-30MHz
Receiver Specification	Rectangular	1.5
LISN Coupling Specification	Rectangular	1.5
Cable and Input Attenuator Calibration	Normal (k=2)	0.5
Mismatch to Reciver	U-Shaped	-0.8 / +0.7
System Repeatability	Normal (k=1)	0.2
Combined Standard Uncertainty	Normal (k=2)	-1.85 / +1.71
Expanded Uncertainty U	Normal (k=2)	-3.7 / +3.42

$$U_{c,minus} = -1.85, U_{c,plus} = 1.71$$

$$U = -3.70 / +3.42 \text{ (} k=2, 95.45\% \text{ confidence level)}$$

Contribution (Radiated Emissions)	Probability Distribution	Uncertainties( $\pm$ dB)
		3 m
Antenna		
Factor	Normal (k=2)	0.9968
Frequency Interpolation	Rectangular	0.1039
Height Variation	Rectangular	-2.6 / +1.5
Directivity Difference	Rectangular	-1.0 / +0
Phase Center Location	Rectangular	1.0
Cable Loss	Normal (k=2)	0.5
Receiver		
Voltage Accuracy	Normal (k=2)	2.0
Pulse Response	Rectangular	1.5
Absolute Repetition Rate	Rectangular	1.5
Mismatch to Receiver		
$ \Gamma_{\text{antenna}}  = 0.33$	U-Shaped	-1.0 / +0.9
$ \Gamma_{\text{receiver}}  = 0.33$		
System Repeatability	Std Deviation	0.5
Combined Standard Uncertainty	Normal	-2.6048 / 2.2775
Expanded Uncertainty U	Normal (k=2)	-5.21 / +4.55

$$U_{c,minus} = -2.6048, U_{c,plus} = 2.2775$$

$$U = -5.21 / +4.55 \text{ (} k=2, 95.45\% \text{ confidence level)}$$

## Equipment Under Test

### EUT Type :

- ☒ Table-Top. ☐ Floor-Standing.  
☐ Table-Top and Floor-Standing (Combination).

### Operation - mode of the E.U.T. :

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

- ☐ Standby Mode  
☒ Operational Condition : ☒ File up/download mode  
☒ FM receiving mode  
☒ Playback mode

### Configuration of the equipment under test :

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

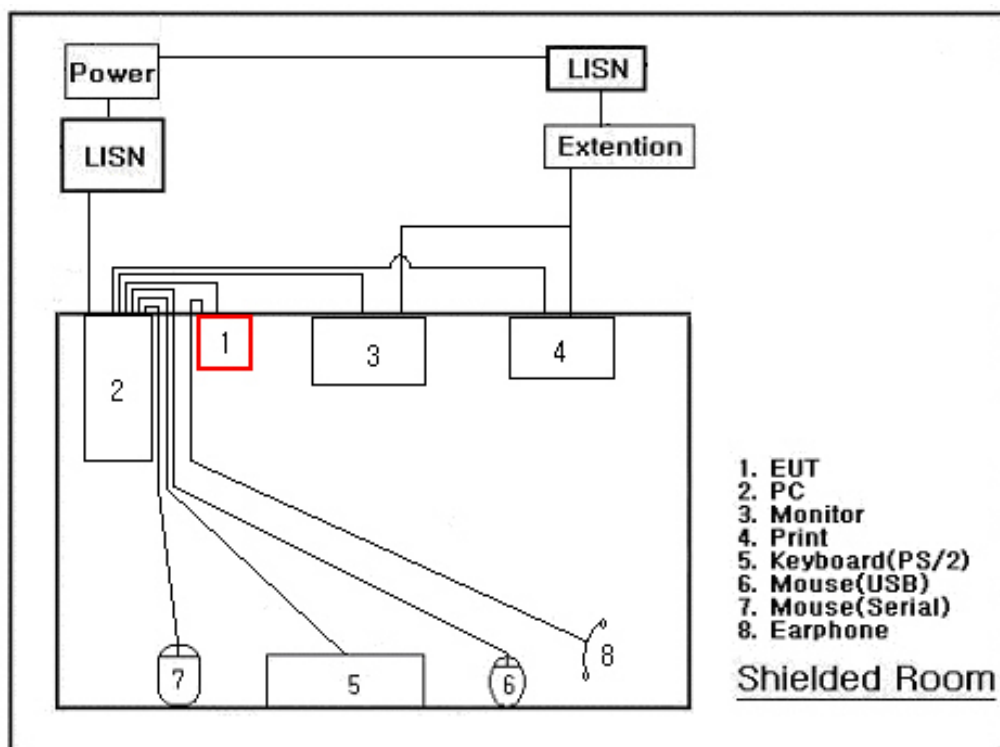
Equipment	Type	Brand	Serial No.	FCC Compliance Info.
PC	dx6120 MT	HP	CNG52000QL	DOC
LCD Monitor	TGL A176	Sampo	52900511 HC00001	
Keyboard(PS/2)	SDL4000	HP	N/A	DOC
Mouse(PS/2)	M-UV69a	HP	N/A	DOC
Mouse(Serial)	M-M28	Logitech	N/A	DZL210365
Printer	A0302380	Northern Telecom	2633S60168	DSI6XU2225C-L

#### Connecting Interface Cables :

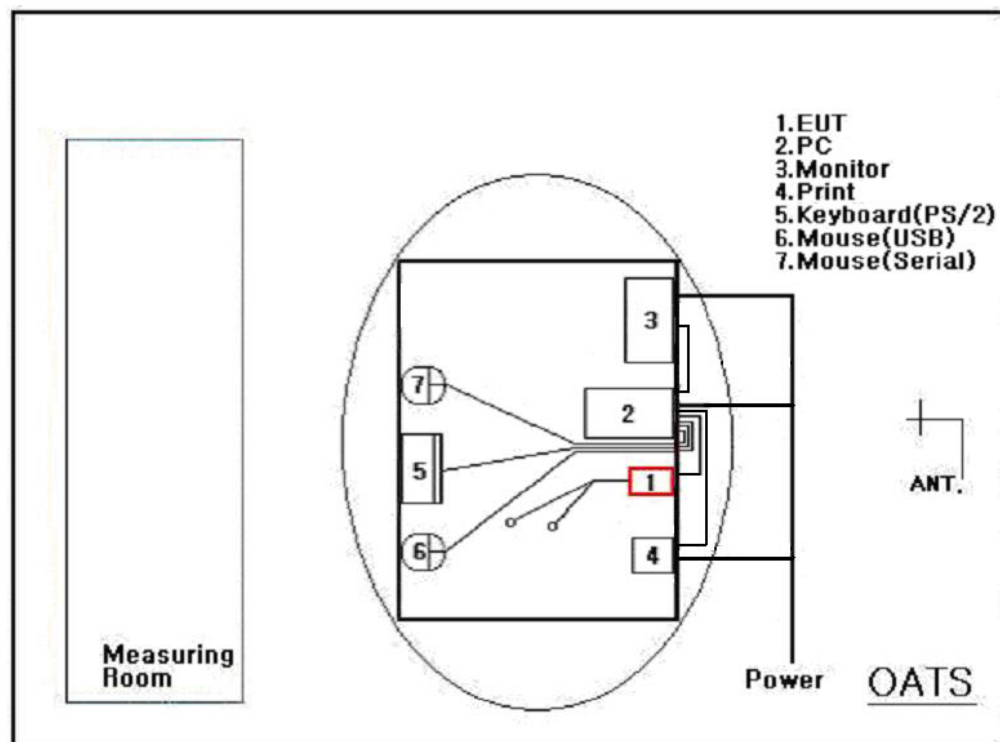
- Unshielded AC power cable : 1.8 m
- Shielded monitor's signal cable (with two ferrite core) : 1.8 m
- Shielded Printer's signal cable (without ferrite core) : 1.8 m
- Unshielded Keyboard's signal cable (without ferrite core) : 1.8 m
- Unshielded Mouse's signal cable (without ferrite core) : 1.8 m
- Unshielded USB cable (with two ferrite core) : 1.2 m
- Unshielded Earphone cable (without ferrite core) : 1.6 m

Note :

## Test Set-Up



### Conducted Emissions



### Radiated Emissions





## TEST CONDITIONS AND DATA

### Conducted Emissions

[Applicable]

#### ◆ Test Equipment Used

Model Name	Description	Manufacture	Calibration Date	Serial Number
ESCS30	Test Receiver	Rohde & Schwarz	Jan. 12, 2006	828985/023
ESH2-Z5	LISN	Rohde & Schwarz	Aug. 12, 2005	861714/012
ESH3-Z2	Pulse Limiter	Rohde & Schwarz	Jul. 12, 2005	357.8810.52

#### ◆ Test Accessories Used

Type	Manufacturer
Aneroid Barometer	Sato
Hygrometer	Sato

◆ Test Program                      File up/download mode

◆ Test Date                              June 14, 2006

◆ Test Area                              Conducted room

*Note : The equipment used is calibrated in regular for every year.*

## Conducted Emissions

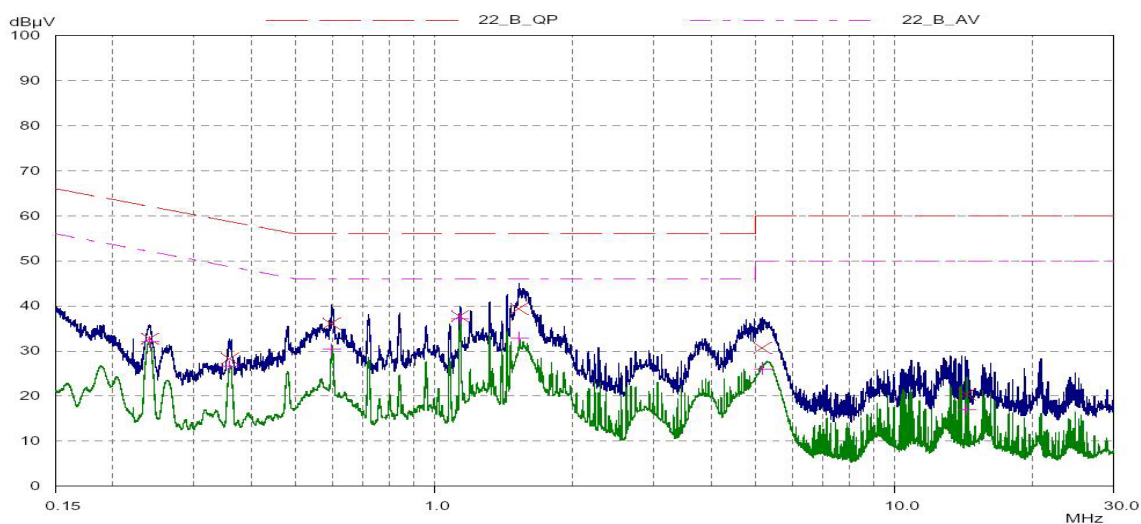
Live Phase

ISTCo.,Ltd.

### Conducted Emission

EUT: EZAV-T4  
Manuf: EZAV Co., Ltd  
Op Cond: File up/down-load  
Operator: S.J. OH  
Test Spec: 120Vac 60Hz  
Comment: LIVE  
PK : BLUE AV : GREEN  
Result File: live.dat :

Scan Settings (1 Range)  
Start 150kHz Stop 30MHz Step 0.2% IF BW 9kHz Detector PK+AV Receiver Settings M-Time 20msec Atten Auto Preamp OFF OpRge 60dB  
Final Measurement: Detectors: X QP / + AV Meas Time: 1sec Peaks: 8 Acc Margin: 25 dB



Freq. [MHz]	Measurement [dB $\mu$ V]		Limit [dB $\mu$ V]		Insertion Loss [dB]	Cable Loss [dB $\mu$ V]	Result [dB $\mu$ V]		Margin [dB]	
	Q-peak	Average	Q-peak	Average			Q-peak	Average	Q-peak	Average
0.240	32.7	32.0	62.1	52.1	0.3	0.3	33.3	32.6	28.8	19.5
0.359	28.3	26.6	58.8	48.8	0.2	0.4	28.9	27.3	29.8	21.5
0.597	36.1	30.4	56.0	46.0	0.2	0.6	36.9	31.1	19.1	14.9
1.137	37.8	37.2	56.0	46.0	0.2	0.6	38.6	38.0	17.4	8.0
1.528	39.4	32.9	56.0	46.0	0.2	0.7	40.3	33.8	15.7	12.2
5.172	30.6	26.1	60.0	50.0	0.3	0.8	31.8	27.2	28.2	22.8
14.387	20.4	17.0	60.0	50.0	0.5	0.8	21.8	18.3	38.3	31.7

Note : PC power line

## Conducted Emissions

Neutral Phase

ISTCo.,Ltd.

### Conducted Emission

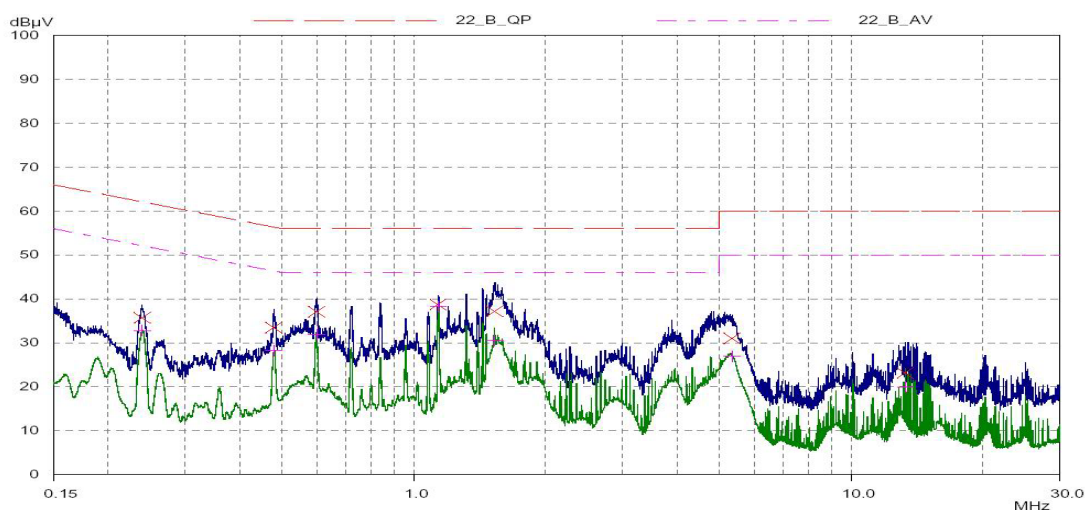
EUT: EZAV-T4  
Manuf: EZAV Co., Ltd  
Op Cond: File up/down-load  
Operator: S.J. OH  
Test Spec: 120Vac 60Hz  
Comment: NEUTRAL  
PK : BLUE AV : GREEN  
Result File: NEUTRAL.dat :

#### Scan Settings

(1 Range)  
Start 150kHz Stop 30MHz Step 0.2% IF BW 9kHz Detector PK+AV Receiver Settings M-Time 20msec Atten Auto Preamp OFF OpRge 60dB

#### Final Measurement:

Detectors: X QP / + AV  
Meas Time: 1sec  
Peaks: 8  
Acc Margin: 25 dB



Freq. [MHz]	Measurement [dB $\mu$ V]		Limit [dB $\mu$ V]		Insertion Loss [dB]	Cable Loss [dB $\mu$ V]	Result [dB $\mu$ V]		Margin [dB]	
	Q-peak	Average	Q-peak	Average			Q-peak	Average	Q-peak	Average
0.238	35.7	32.8	62.2	52.2	0.3	0.3	36.3	33.4	25.9	18.8
0.478	33.4	28.2	56.4	46.4	0.2	0.5	34.1	28.9	22.3	17.5
0.600	37.1	31.9	56.0	46.0	0.2	0.6	37.9	32.7	18.1	13.3
1.137	38.7	38.3	56.0	46.0	0.2	0.6	39.5	39.1	16.5	6.9
1.531	37.2	30.6	56.0	46.0	0.3	0.7	38.1	31.5	17.9	14.5
5.340	31.0	27.0	60.0	50.0	0.3	0.8	32.2	28.1	27.8	21.9
13.308	23.1	20.0	60.0	50.0	0.5	0.8	24.4	21.3	35.6	28.7

Note : PC power line

## TEST CONDITIONS AND DATA

### Radiated Emission

[Applicable]

#### ◆ Test Equipment Used

Name	Type	Manufacturer	Calibration. Date	Serial Number
ESCS30	Test Receiver	Rohde & Schwarz	Jan. 12, 2006	828985/023
VULB 9160	Antenna	Schwarzbeck	Sep. 28, 2005	3071

#### ◆ Test Accessories Used

Type	Manufacturer
Aneroid Barometer	Sato
Hygrometer	Sato

◆ Test Program                      File up/download mode  
                                         FM receiving mode  
                                         Playback mode

◆ Test Date                              June 12, 2006

◆ Test Area                              Open site

*Note : The equipment used is calibrated in regular for every year.*

***Z axis plane was the worst test result than Y axis plane and X axis plane.***

### **Radiated Emissions**

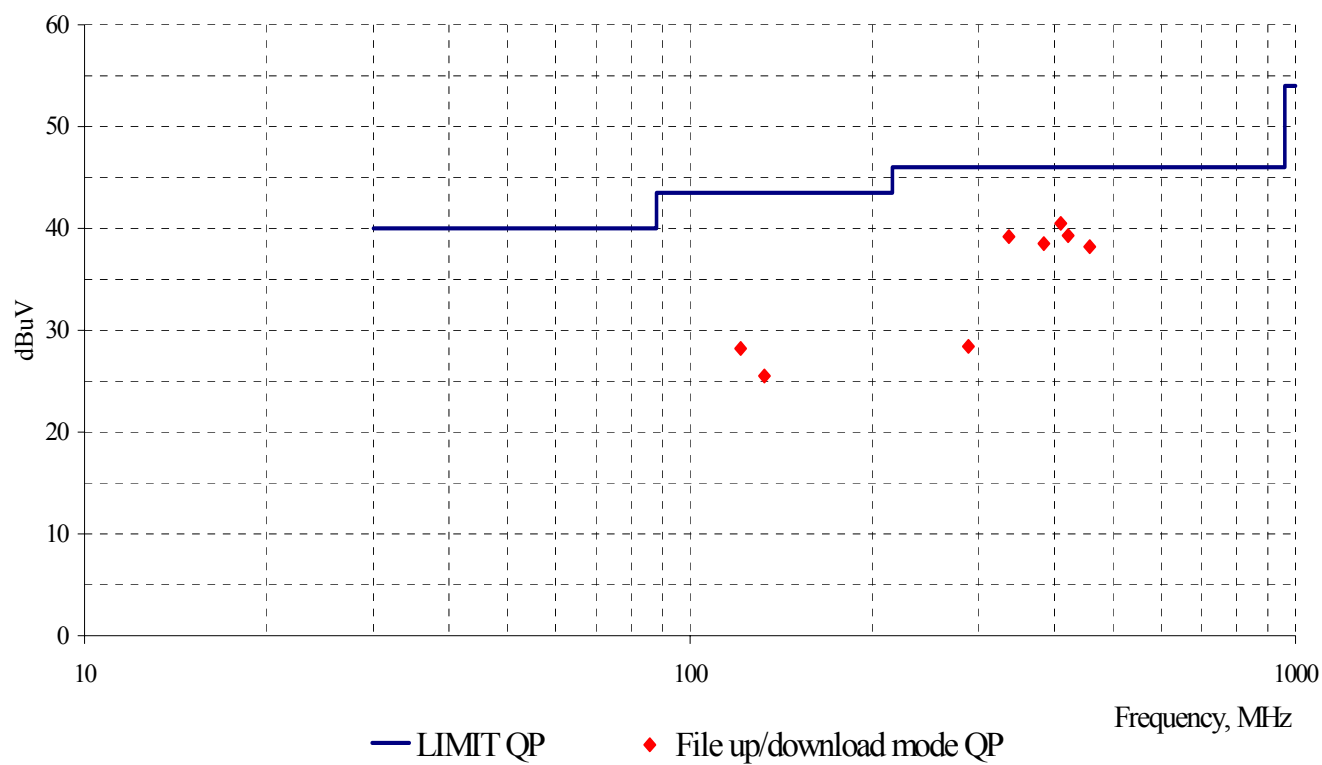
(Disturbance Radiation)

**[Applicable]**

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB/m]	Cable Loss [dB]	Polar. [H/V]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
121.2	14.3	11.4	2.5	V	28.2	43.5	15.3
132.7	12.3	10.7	2.5	V	25.5	43.5	18.0
288.2	12.4	11.8	4.2	V	28.4	46.0	17.6
336.4	21.6	13.1	4.5	V	39.2	46.0	6.8
384.1	19.4	14.2	4.9	V	38.5	46.0	7.5
409.5	20.4	14.8	5.3	H	40.5	46.0	5.5
421.2	18.7	15.3	5.3	H	39.3	46.0	6.7
457.3	15.8	16.8	5.6	H	38.2	46.0	7.8

*Note: **File up/download mode.***

## MEASUREMENT OF DISTURBANCE RADIATION



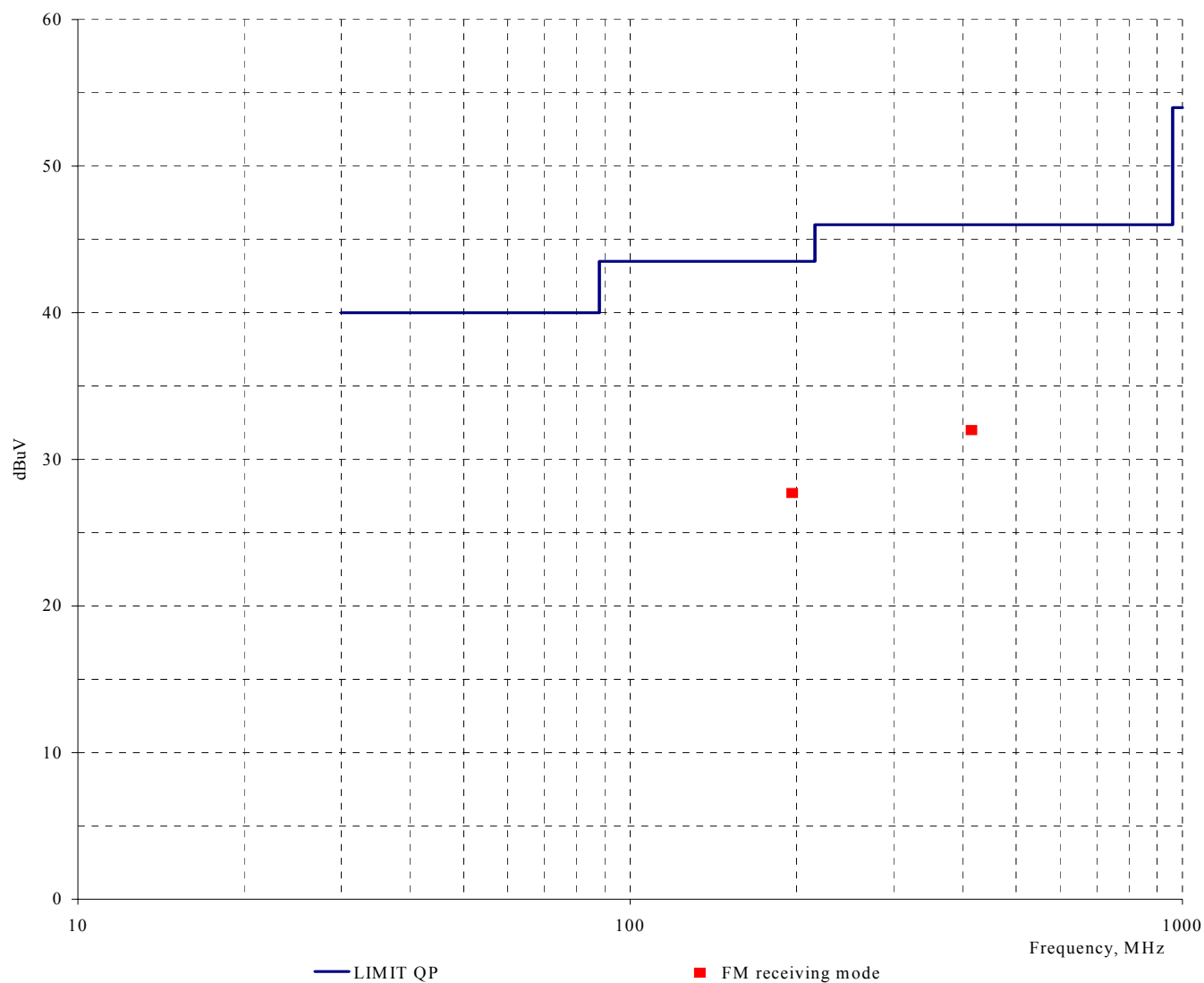
**[Applicable]**

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB/m]	Cable Loss [dB]	Polar. [H/V]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
196.5	15.4	9.0	3.3	V	27.7	43.5	15.8
415.0	11.4	15.3	5.3	H	32.0	46.0	14.0

*Note : **FM receiving mode.***



## MEASUREMENT OF DISTURBANCE RADIATION



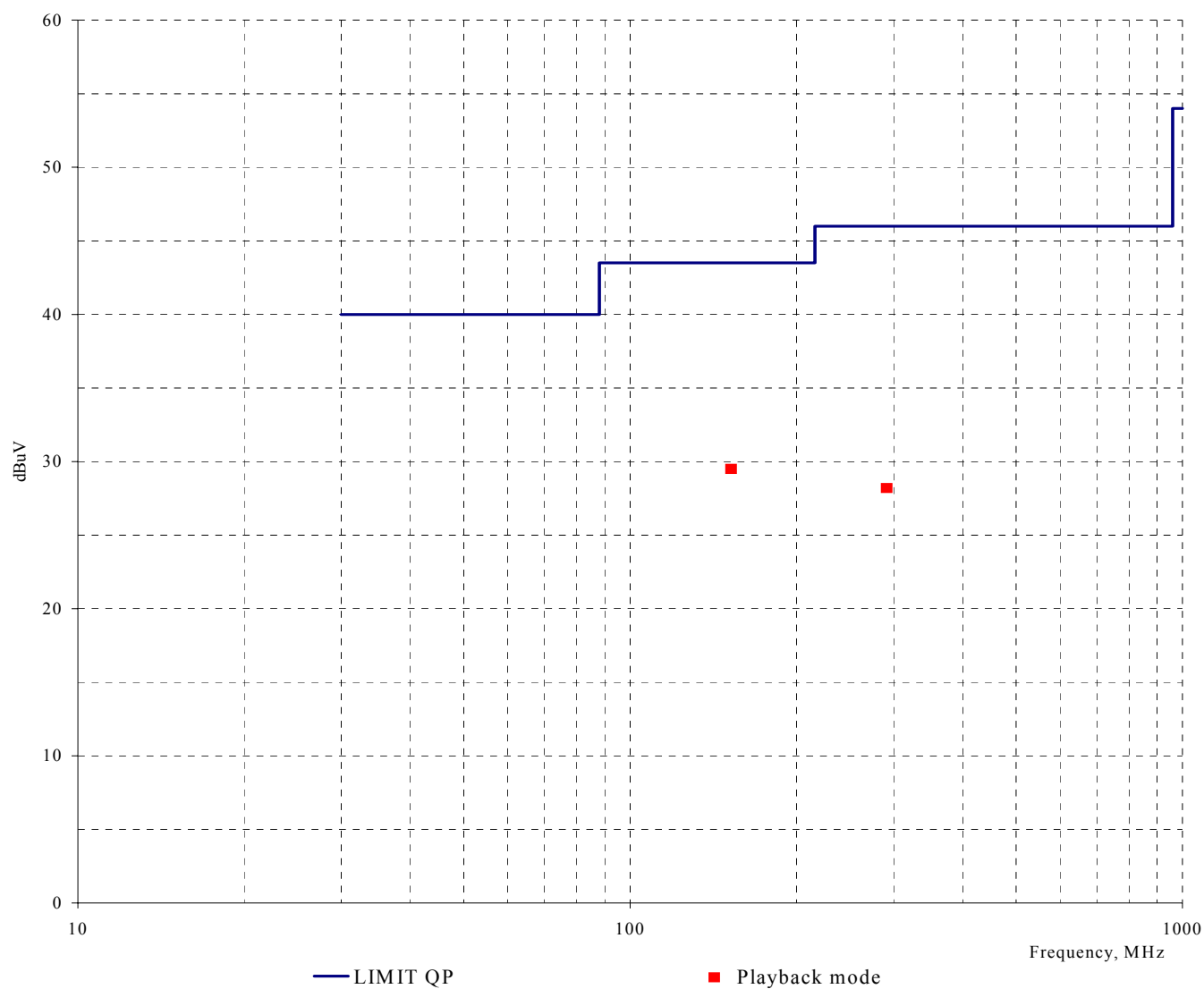
[Applicable]

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB/m]	Cable Loss [dB]	Polar. [H/V]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
152.4	14.3	12.3	2.9	H	29.5	43.5	14.0
291.4	12.3	11.7	4.2	V	28.2	46.0	17.8

Note : **Playback mode.**

End of Data

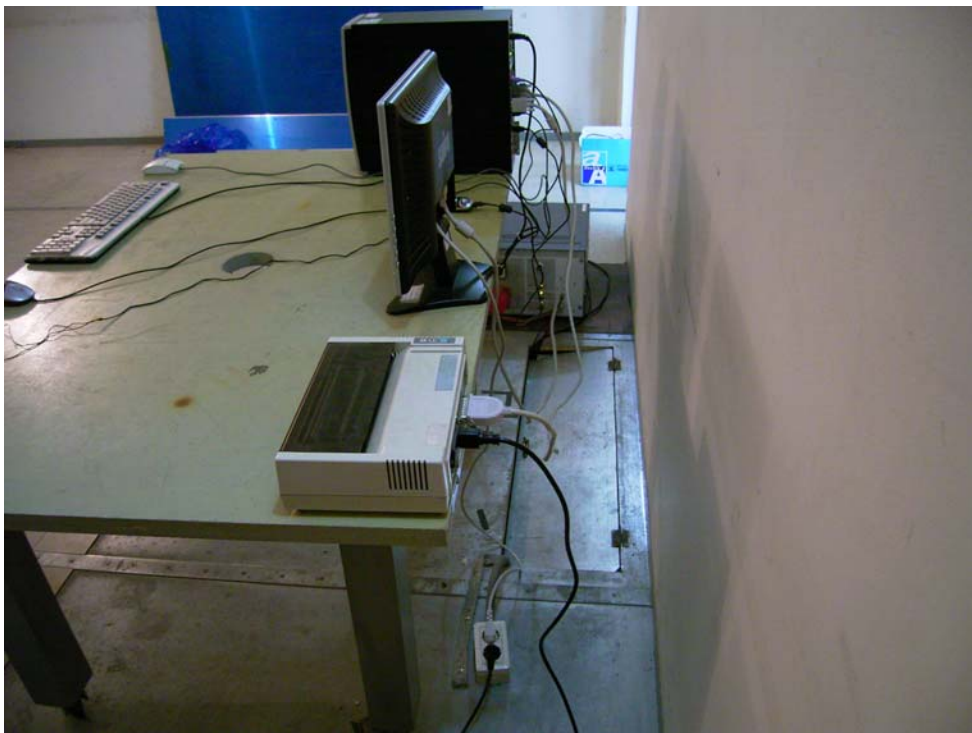
## MEASUREMENT OF DISTURBANCE RADIATION



**Appendix A. The Photos of Test Setup**



**Conducted Emissions(PC power line) - Front View**



**Conducted Emissions(PC power line) - Rear View**

**Appendix A. The Photos of Test Setup**



**Radiated Emissions(File up/download mode)-Front View**



**Radiated Emissions(File up/download mode)-Front View**



**Appendix A. The Photos of Test Setup**



**Radiated Emissions (FM receiving/Playback mode) X-axis View**



**Radiated Emissions (FM receiving/Playback mode) -Y-axis View**



**Radiated Emissions (FM receiving/Playback mode) -Z-axis View**

**Appendix B. The Photos of Equipment Under Test**



Front View



Rear View



Appendix B. The Photos of Equipment Under Test



USB cable



Earphone