



# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B CERTIFICATION

Test report file number : E03NR-012

Applicant : SEDO CO., LTD.

Address : 64-3 Sangdaewon-Dong, Jungwon-Gu, Sungnam-Si, Kyunggido Korea

Manufacturer : SEDO CO., LTD.

Address : 64-3 Sangdaewon-Dong, Jungwon-Gu, Sungnam-Si, Kyunggido Korea

Type of Equipment : DVR CARD

FCC ID : QDZDF-4900

Model / Type No. : DF-4900

Serial number : N/A

Total page of Report : 16 pages (including this page)

Date of Incoming : October 22, 2003

Date of issuing : November 5, 2003

## SUMMARY

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

This test report contains only the result 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.

Prepared by:

G. W. Lee / Chief Engineer  
EMC Dept.  
ONETECH Corp.

Reviewed by:

Y. K. Kwon / Director  
EMC Dept.  
ONETECH Corp.



## CONTENTS

	Page
1. VERIFICATION OF COMPLIANCE.....	3
2. GENERAL INFORMATION.....	4
2.1 PRODUCT DESCRIPTION.....	4
2.2 MODEL DIFFERENCES.....	4
2.3 RELATED SUBMITTAL(S) / GRANT(S) .....	4
2.4 TEST SYSTEM DETAILS .....	5
2.5 TEST METHODOLOGY .....	5
2.6 TEST FACILITY .....	5
3. SYSTEM TEST CONFIGURATION.....	6
3.1 JUSTIFICATION .....	6
3.2 EUT EXERCISE SOFTWARE.....	6
3.3 CABLE DESCRIPTION .....	6
3.4 NOISE SUPPRESSION PARTS ON CABLE .....	7
3.5 EQUIPMENT MODIFICATIONS .....	7
3.6 CONFIGURATION OF TEST SYSTEM .....	7
4. PRELIMINARY TEST.....	8
4.1 AC POWER LINE CONDUCTED EMISSION TEST .....	8
4.2 RADIATED EMISSION TEST .....	8
5. FINAL RESULT OF MEASUREMENT .....	9
5.1 CONDUCTED EMISSION TEST.....	9
5.2 RADIATED EMISSION TEST .....	11
6. FIELD STRENGTH CALCULATION .....	12
7. LIST OF TEST EQUIPMENT.....	13

**1. VERIFICATION OF COMPLIANCE**

APPLICANT : SEDO CO., LTD.  
ADDRESS : 64-3 Sangdaewon-Dong, Jungwon-Gu, Sunnam-Si, Kyunggido Korea  
CONTACT PERSON : Mr. Nam-Seog, Jo / Senior Manager  
TELEPHONE NO : +82-31-741-0303  
FCC ID : QDZDF-4900  
MODEL NO/NAME : DF-4900  
SERIAL NUMBER : N/A  
DATE : November 5, 2003

DEVICE TYPE	Peripheral Device for Class B Computing Device - Unintentional Radiator
E.U.T. DESCRIPTION	DVR CARD
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4/1992
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC CFR 47 PART 15 §15.101
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	Yes
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

- This device has shown compliance with the conducted emissions limits in 15.107 adopted under FCC 02-107 (ET Docket 98-80). The device may be marketed after July 11, 2005 and is not affected by the 15.37(j) transition provisions.
- 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 SEDO CO., LTD., Model DF-4900 (referred to as the EUT in this report) is a DVR CARD installed at PCI slot into a personal computer. The EUT can record and display the image captured by the CCD camera on the monitor and used in residential and/or commercial area. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Not Applicable
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	24.576 MHz and 54 MHz
NUMBER OF LAYERS	Main Board: 4 Layers
ELECTRICAL RATING	DC 5 V from PC
CAMERA / AUDIO INPUT	9Ch / 1Ch. Audio Input
DISPLAY / RECORDING SPEED(FPS)	270 FPS / 60 FPS
SCREEN DIVISION	1,4,6,7,9
RESOLUTION	320 × 240, 720 × 480, 720 × 240
COMPRESSION	MJPEG, MPEG4, MPEG4+ selectable
RECORDING TYPE	Sequence, Scheduled, Motion, Sensor Recording
	Pre Alarm / Post Alarm Recording
MOTION DETECTION	Multi-zones, Multi-channels
SENSOR INPUT/CONTROL OUTPUT	9/9 (option)
AUTO SWITCHING	1, 4, 6, 7Ch. by time interval
WATCH DOG	Auto rebooting
PAN/TILT CONTROL	RS232C (Pan/Tilt/Zoom/Focus/Preset/Group)
NETWORK	Remote monitoring, recording, searching and Pan/Tilt control anywhere in the world via TCP/IP, IPX, PSTN, ISDN, ADSL, etc.
STORAGE STRUCTURE	Own DB Structure
DATA BACKUP	HDD, CD-RW, DVD, DAT, ZIP, AVI, etc.
INTERFACE	BNC Cable 2 Port, Video Out Port

### 2.2 Model Differences

None

### 2.3 Related Submittal(s) / Grant(s)

Original submittal only



## 2.4 Test System Details

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

Model	Manufacturer	FCC ID	Description	Connected to
DF-4900	SEDO CO., LTD.	PBCFCD-524	DVR CARD (EUT)	-
GX240	Newtec Computer Corp.	DoC	PC	EUT
E551	DELL Computer Corp.	DoC	PC Monitor	PC
SK-8100	Silitek	DoC	Keyboard	PC
X06-08477	Microsoft Corp.	DoC	Mouse	PC
020-0470	Cardinal	GDE0196	Modem	PC
SAM-14M	Samsung	N/A	CCTV Monitor	EUT
2225C	HP	DS16XU2225	Printer	PC
N/A	N/A	N/A	CCD Camera	EUT

## 2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4/1992. 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 426-1 Daessangryung-Ri, Chowol-Myun, Gwangju-Si, Gyeonggi-Do 464-080 Korea. Description details of test facilities were submitted to the Commission on January 18, 2002. (Registration Number: 92819)



### 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	SEDO CO., LTD.	DF-4900	QDZDF-4900

#### 3.2 EUT exercise Software

The EUT was installed into a PCI slot on the main board in a personal computer and then the captured images by the CCD cameras were continuously displayed on the monitors.

#### 3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
DVR CARD (EUT)	-	N	0.3(D)
PC	N	-	1.5(P)
PC Monitor	N	Y	1.5(P), 1.2(D)
Keyboard	N/A	N	1.2(D)
Mouse	N/A	N	1.5(D)
Modem	N	Y	1.5(P), 1.5(D)
TV Monitor	N	Y	1.5(P), 3.0(D)
Printer	N	Y	1.5(P), 1.5(D)
CCD Camera	N	Y	1.5(P), 3.0(D)

\* The marked “(P)” means the Power Cable and “(D)” means Signal Cable.



### 3.4 Noise Suppression Parts on Cable

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
DVR CARD (EUT)	N	N/A	Y	BOTH END
PC	-	-	-	-
PC Monitor	N	PC END	Y	PC END
Keyboard	N	N/A	Y	PC END
Mouse	N	N/A	Y	BOTH END
Modem	N	N/A	Y	BOTH END
TV Monitor	N	N/A	Y	PC END
Printer	N	N/A	Y	BOTH END
CCD Camera	N	N/A	Y	BOTH END

### 3.5 Equipment Modifications

To achieve compliance to CLASS B levels, the following change(s) was made by ONETECH Corp. during compliance testing:

“There were no Modified items during EMI test”

### 3.6 Configuration of Test System

**Line Conducted Test:** The EUT was installed at PCI slot inside a personal computer (PC). The power cord of PC was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power lines Conducted Emission test was performed by using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions.

**Radiated Emission Test:** Preliminary radiated emission test was conducted using the procedure in ANSI C63.4/1992 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 Worse operating condition (Please check one only)
The images of camera were continuously displayed on the monitor.	X

**4.2 Radiated Emission Test**

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
The images of camera were continuously displayed on the monitor.	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

Humidity Level : 50 %

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 -16.91 dB at 0.15 MHz at Peak Mode

EUT : DVR CARD

Date: October 23, 2003

Operating Condition : The image of camera was continuously displayed on the monitor.

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

Frequency (MHz)	Line	Quasi-Peak (dBuV)			Margin (dB)	Average (dBuV)		Margin (dB)
		Emission level	Detect Mode	Limits		Emission level	Limits	
0.15	H	49.09	P	66.00	-16.91	-	56.00	-
0.22	N	43.27	P	62.82	-19.55	-	52.82	-
0.29	N	41.31	P	60.38	-19.07	-	50.38	-
0.44	N	36.22	P	57.06	-20.84	-	47.06	-
0.59	N	33.87	P	56.00	-22.13	-	46.00	-
4.02	H	31.51	P	56.00	-24.49	-	46.00	-
8.92	N	37.91	P	60.00	-22.09	-	50.00	-
29.62	H	30.71	P	60.00	-29.29	-	50.00	-

Line Conducted Emission Tabulated Data

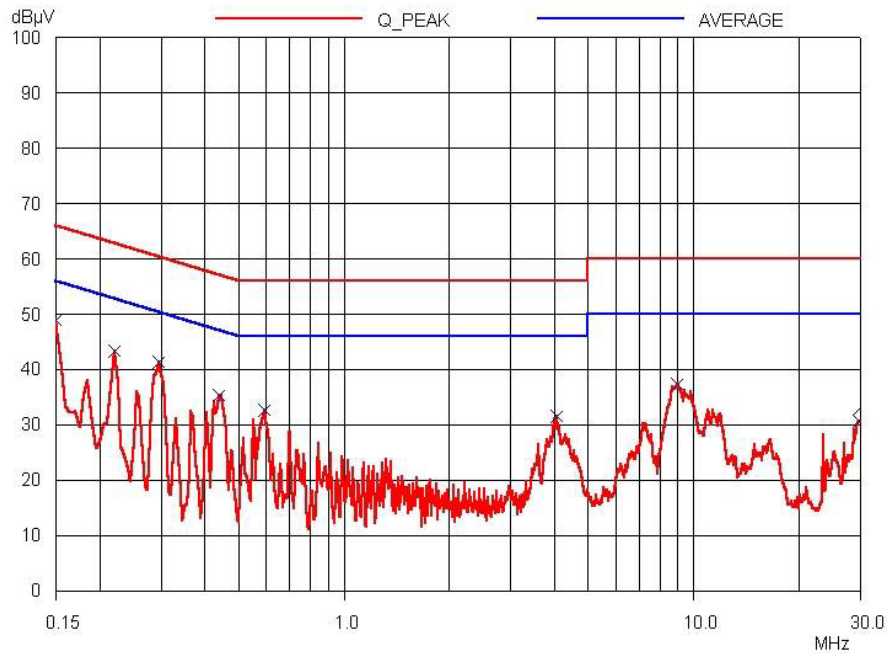
Remark: "H": Hot Line, "N": Neutral Line, "P": Peak Detector mode.

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

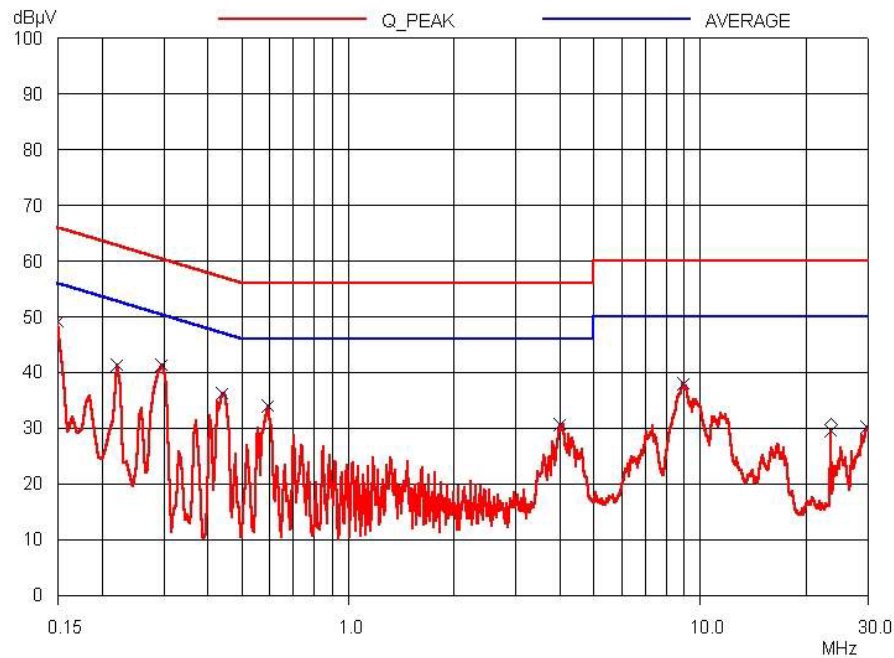
Average mode was not measured, because peak values were under the average limit.

기홍

Tested by: Ki-Hong, Nam / Test Engineer



HOT LINE



NEUTRAL LINE



## 5.2 Radiated Emission Test

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

Humidity Level : 50 % Temperature: 19 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109(g)  
 Type of Test : CLASS B  
 Result : PASSED BY -5.03 dB at 189.02 MHz

EUT : DVR CARD Date: October 24, 2003  
 Operating Condition : The image of camera was continuously displayed on the monitor.  
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)  
 Distance : 3 Meter

Radiated Emission		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)
53.69	21.70	H	10.28	0.97	32.95	40.00	-7.05
81.00	18.30	H	6.73	1.02	26.05	40.00	-13.95
108.00	19.20	V	12.75	1.19	33.14	40.00	-6.86
135.16	19.70	V	12.75	1.29	33.74	40.00	-6.26
189.02	17.00	V	16.47	1.50	34.97	40.00	-5.03
242.80	20.60	H	11.75	1.79	34.14	47.00	-12.86
270.00	18.30	H	12.74	1.88	32.92	47.00	-14.08
324.20	23.40	H	14.19	2.15	39.74	47.00	-7.26
378.40	19.10	H	14.68	2.40	36.18	47.00	-10.82
404.60	15.90	H	15.31	2.44	33.65	47.00	-13.35

Radiated Emission Tabulated Data

기홍

Tested by: Ki-Hong, Nam / 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	ESVS 10	827864/005	OCT/03	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	APR/03	12MONTH	■
3.	Spectrum analyzer	HP	HP8567A	3021A00773	JUN/03	12MONTH	■
4.	RF preselector	HP	HP85685A	3107A01268	JUN/03	12MONTH	■
5.	Quasi-Peak Adapter	HP	HP85650A	3107A01550	JUN/03	12MONTH	■
6.	Matching Pad	TME	ZT-130	9F 954	N/A	N/A	□
7.	Color Pattern Generator	Leader	408NPS	3307198	JUN/03	12MONTH	□
8.	Signal Generator	HP	8657A	3134A-03919	JUN/03	12MONTH	□
9.	Biconical antenna	Schwarzbeck	VHA9103	91031852	AUG/03	12MONTH	■
10.	Log Periodic antenna	Schwarzbeck	9108-A(494)	62281001	AUG/03	12MONTH	■
11.	LISN	EMCO	3825/2	9109-1867 9109-1869	JUL/03	12MONTH	■
12.	Position Controller	HD	HD100	100/788	N/A	N/A	■
13.	Turn Table	HD	DS412S	N/A	N/A	N/A	■
14.	Antenna Master	HD	HD240	N/A	N/A	N/A	■