

MEASUREMENT/TECHNICAL REPORT

APPLICANT: Sparkle Computer Co., Ltd.

MODEL NO.: SP6900

FCC ID: M696900

This report concerns (check one) :		Original Grant ☒
		Class II Change ☐
Equipment type:	VGA Card	
Deferred grant requested per 47CFR 0.457(d)(1)(ii)?		
Yes ☐ No ☒ If yes, defer until: (date)		
We, the undersigned, agree to notify the Commission by (date) / / of the intended date of announce ment of the product so that the grant can be issued on that date.		
Transiyion Rules Request per 15.37?		Yes ☐ No ☒
If no, assumed Part 15, Subpart B for unintentional radiator the new 47 CFR (10-1-90 Edition) provision.		
Report Prepared		
by Testing House :	Neutron Engineering Inc.	
for Company Name:	Sparkle Computer Co., Ltd.	
Address:	13F, No. 2, Sec. 1, Fu Hsing S. Rd., Taipei, Taiwan, R.O.C.	
Applicant Signature :		
	_____ Jack Hsiao/ Manager	

CERTIFICATION

We hereby certify that:

The test data , data evaluation , test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (1992)/ CISPR22(1997) and the energy emitted by the sample EUT tested as described in this report is in compliance with CLASS B conducted and radiated emission limits of FCC Rules Part 15, Subpart B/ CISPR22(1996).

Prepared by : Kathy Hsu



Reviewed by : Vincent Su



Approved by : George Yao



Issued Date : Jul. 09, 2001

Report No. : NEI-FCCB-01102

Company Stamp :

**NEUTRON ENGINEERING INC.**

No. 132-1, Lane 329, Sec. 2, Palain Rd.,
Shijr Jen, Taipei, Taiwan
TEL : (02) 2646-5426 FAX : (02) 2646-6815

Table of Contents

1. General Information.....	
1-1 Product Description.....	4
1-2 Related Submittal(s)/Grant(s).....	4
1-3 Tested System Details.....	5
1-4 Test Methodology.....	6
1-5 Test Facility.....	6
2. System Test Configuration.....	
2-1 Justification.....	7
2-2 EUT Exercise Software.....	7
2-3 Special Accessories.....	8
2-4 Equipment Modifications.....	8
2-5 Configuration of Tested System.....	9
Figure 2-1 Configuration of Tested System.....	11
3. Block Diagram(s).....	12
4. Conducted Emission Datas.....	13
5. Radiated Emission Datas	
5-1 Radiated Emission Data.....	15
5-2 Field Strength Calculation.....	17
5-3 Correction Factor Table VS Frequency.....	18
6. Attachment.....	
Photos of Tested EUT.....	19
User' s Manual.....	20

1. GENERAL INFORMATION

1-1. Product Description

The Sparkle Computer Co., Ltd. Model: SP6900(referred to as the EUT in this report) is a VGA Card 8MB on Board with SDRAM or SGRAM.

The summarized feature of EUT as following:

- Supports AGP 1.0 compliant configuration setting
- Supports AGP 133MHz
- Built-in a high performance 3DEngine
- Built-in a high quality 3D engine
- Built-in 42 double-words hardware command queue
- Built-in Direct Draw Accelerator
- Supports burst frame buffer read/write for SDRAM/SGRAM
- Built-in 64x64x2 bit-mapped hardware cursor
- Maximum 8M Bytes frame buffer with linear addressing
- Built-in 4 stages engine write-buffer
- Built-in 64x32 CRT FIFOs to support super high resolution graphics modes
- Built-in complete NTSC/PAL video encoder
- Supports NTSC/PAL interlaced display in
- Supports under-scan and over-scan scaling
- Supports single frame buffer architecture
- Supports bi-linear video interpolation with integer increments of 1/64
- Support Direct Draw Drivers
- Supports SDRAM, and SGRAM timing
- Supports 8MB memory configurations
- Supports up to 1Mx16 SDRAM and 1Mx32 SGRAM types up to 90MHz
- Built-in programmable 24-bit true-color RAMDAC up to 175MHz pixel clock
- Built-in two 196x64 video line buffers for MPEG video playback
- Windows2000, WindowsNT 4.0/5.0, Windows98 and Windows95

A more detailed and/or technical description of EUT is attached in **User' s Manual**.

1-2. Related Submittal(s) / Grant (s)

1-2-1. Models Covered

Models covering in this test report is : SP6900

1-2-2. Models Difference

N/A

1-3. Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

Model No.	FCC ID	Equipment	Cable
SP6900	M696900	VGA Card	Add-On Card , Shielded Data Cable
CM753ET	N/A (3)	Monitor	Shielded Data Cable ⁽²⁾ Un-Shielded Power Cord
VECTRA VE C/333	N/A (3)	PC	Un-Shielded Power Cord.
DPU-414	N/A (3)	Printer	Shielded Serial Data Cable Un-Shielded Power Cord
DM-1414V	N/A (3)	Modem	Shielded Parallel Data Cable Un-Shielded Power Cord
FDA-104GA	F42FDA-104G	Keyboard	Shielded Data Cable
M-S34	N/A (3)	Mouse	Shielded Data Cable
PVM-1390	AK896APVM1390	TV	Shielded Data Cable ⁽²⁾ Un-Shielded Power Cord

Notes:

- (1) EUT submitted for grant.
- (2) Monitor' s attached video cable without ferrite core.
- (3) The support equipment was authorized by Declaration of Conformity.

1-4. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (1992)/CISPR 22(1997). Radiated testing was performed at an antenna to EUT distance 10 meters.

1-5. Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the address of No. 132-1, Lane 329, Sec. 2, Palain Road, Shijr 221, Taipei, Taiwan, R.O.C. of NEUTRON ENGINEERING INC. This site has been fully described in report dated Jun. 25, 1999 Submitted to your office, and accepted in a letter dated Sep. 02, 1999 (Reg. No. 95335).

2. System Test Configuration

2-1. Justification

The system was configured for testing in a typical fashion (as a customer would normally use it). The EUT (VGA Card) was Added-On to a support equipment-Personal Computer. Peripherals of PC, such as monitor, keyboard, modem and printer were contained in this system in order to comply with the ANSI C63.4/CISPR 22 Rules requirement.

The system was investigated/evaluated by pre-scanning the pixel resolution in follows mode(s):

- ☒ the default mode of 640 X 480/31.5KHz
- ☒ the highest resolution mode of 1600x1200/106KHz Hsync. 85Hz refresh
- ☒ S Video Out.
- ☒ DVI out of resolution mode of 1600x1200/60KHz Hsync. 75Hz refresh

The system operated in following mode(s) was(were) found to be the worst case during the pre-scanning. This operating mode(s) was(were) tested and used to collect the data included.

- ☒ the highest resolution mode of 1600x1200/106KHz Hsync. 85Hz refresh
- ☒ DVI out of resolution mode of 1600x1200/60KHz Hsync. 75Hz refresh

2-2. EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software, contained on a 3-1/2 inch disk, was inserted into driver A and is auto-starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is:

1. Read(write) from(to) mass storage device (Disk).
2. Send "H" pattern to video port device (Monitor).
3. Send "H" pattern to video port device (TV)
4. Send " H " pattern to parallel port device (Printer).
5. Send " H " pattern to serial port device (Modem).
6. Repeated from 2 to 5 continuously.

As the keyboard and mouse are strictly input devices, no data is transmitted to (from) them during test. They are, however, continuously scanned for data input activity.

2-3. Special Accessories

Not available for this EUT intended for grant.

2-4. Equipment Modifications

Not available for this EUT intended for grant.

Applicant Signature :

Jack Hsiao

Date:

Jul. 02, 2001

Type/Printed Name:

Jack Hsiao

Position:

Manager

2.5 Configuration of Tested System

The configuration of tested system is described as the block diagram shown in next page Figure 3.1 and details information of I/O cable and power cord connection are tabulated as Table A and B. The monitor is powered from a floor mounted receptacle (referred to as the wall outlet in the previous described) was tested.

TABLE A - Test Equipment

Item	Equipment	Mfr.	Model/Type No.	I/O Port	FCC ID	Remark
E-1	VGA Card	Sparkle	SP6900	AGP Slot	M696900	EUT
E-2	Monitor	Hitachi	CM753ET	VGA Port	N/A (3)	
E-3	PC	HP	VECTRA VE C/333		N/A (3)	
E-4	Printer	SII	DPU-414	Printer Port	N/A (3)	
E-5	Modem	ACEEX	DM-1414V	Com Port	N/A (3)	
E-6	Keyboard	Forward	FDA-104GA	PS/2 Port	F42FDA-104G	
E-7	Mouse	HP	M-S34	PS/2 Port	N/A (3)	
E-8	TV	SONY	PVM-1390	S-Video Port	AK896APVM1390	

Remark:

- (1) Unless otherwise denoted as EUT in 'Remark' column, device(s) used in tested system is a support equipment.
- (2) Unless otherwise marked as in 'Remark' column, Neutron consigns the supporting equipment(s) to the tested system.
- (3) The support equipment was authorized by Declaration of Conformity.

Table B. - Informations Cable Information

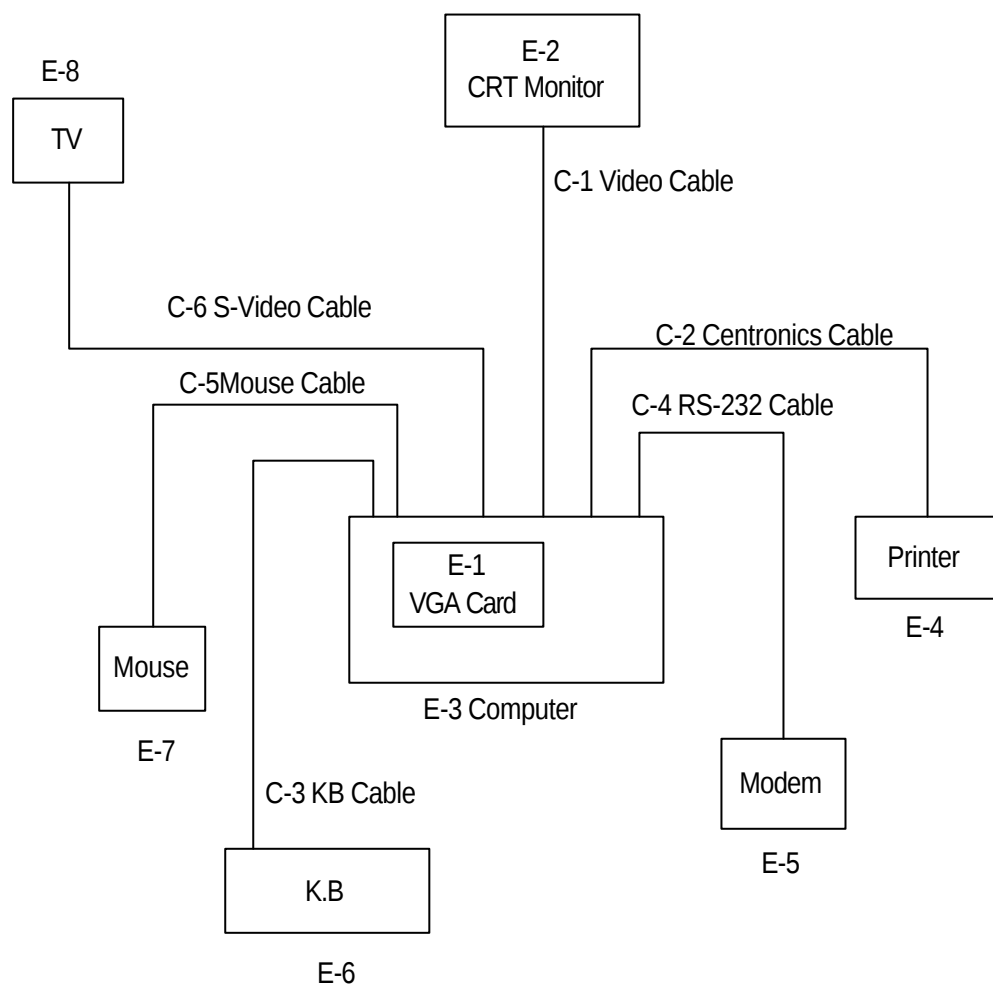
Item	I/O Cable	Device Connected	Shielded	Ferrite Core	Detachable/Permanently	Note
C-1	Video Cable	EUT-Monitor	Yes	No	Permanently attached on Monitor	
C-2	Centronics Cable	PC-Printer	Yes	No	Part of Printer, Detachable	
C-3	Keyboard Cable	PC-Keyboard	Yes	No	Permanently attached on KB	
C-4	RS-232 Cable	PC-Modem	Yes	No	Part of Modem, Detachable	
C-5	Mouse Cable	PC-Mouse	Yes	No	Permanently attached on Mouse	
C-6	S-Video Cable	EUT-TV	Yes	No	Detachable	

Note:

- (1) Unless otherwise marked as in (Remark) column, Neutron consigns the supporting equipment(s) to the tested system.

Figure 3.1 Configuration of Tested System

Fig. 2-1 Configuration of Tested System



3. Block Diagram(s)

Figure 3.1 Block diagram of system, Page 13.A

4. Conducted Emission Datas

4.1 The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Judgement: Passed by **-5.08 dB** in mode of **Line** terminal **0.16 MHz**

Test Mode: 1600x1200/75Hz/60KHz/DVI

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Safe Margins (dBuV)	
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		Note
0.16	Line	54.40	50.33	65.41	55.41	-5.08	(AV)
0.22	Line	45.86	*	62.82	52.82	-16.96	(QP)
0.33	Line	40.02	*	59.48	49.48	-19.46	(QP)
0.91	Line	42.06	*	56.00	46.00	-13.94	(QP)
12.19	Line	31.90	*	60.00	50.00	-28.10	(QP)
26.42	Line	35.93	*	60.00	50.00	-24.07	(QP)
0.17	Neutral	47.26	*	65.16	55.16	-17.90	(QP)
0.20	Neutral	46.00	*	63.65	53.65	-17.65	(QP)
0.91	Neutral	42.29	*	56.00	46.00	-13.71	(QP)
3.94	Neutral	35.81	*	56.00	46.00	-20.19	(QP)
12.00	Neutral	30.95	*	60.00	50.00	-29.05	(QP)
26.42	Neutral	37.85	*	60.00	50.00	-22.15	(QP)

Remark :

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=100KHz,VBW =100KHz, Swp. Time = 0.3 sec./MHz。 Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz,VBW=10Hz, Swp. Time =0.3 sec./MHz。
- (2) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a " *" marked in AVG Mode column of Interference Voltage Measured.
- (3) Measuring frequency range from 150KHz to 30MHz。

Review: Timothy Su Test Engr.: Jason Test Date : Jul. 02, 2001

4. Conducted Emission Datas

4.1 The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Judgement: Passed by **-11.57 dB** in mode of **Line** terminal **0.16 MHz**

Test Mode: 1600x1200/85Hz/106KHz/CRT

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Safe Margins (dBuV)	
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		Note
0.16	Line	54.10	*	65.67	55.67	-11.57	(QP)
0.22	Line	45.29	*	62.82	52.82	-17.53	(QP)
0.33	Line	41.60	*	59.48	49.48	-17.88	(QP)
0.85	Line	41.51	*	56.00	46.00	-14.49	(QP)
11.93	Line	32.41	*	60.00	50.00	-27.59	(QP)
28.76	Line	38.48	*	60.00	50.00	-21.52	(QP)
0.15	Neutral	49.36	*	65.89	55.89	-16.53	(QP)
0.21	Neutral	42.94	*	63.13	53.13	-20.19	(QP)
0.59	Neutral	37.44	*	56.00	46.00	-18.56	(QP)
0.85	Neutral	41.81	*	56.00	46.00	-14.19	(QP)
12.92	Neutral	26.67	*	60.00	50.00	-33.33	(QP)
27.86	Neutral	38.42	*	60.00	50.00	-21.58	(QP)

Remark :

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=100KHz,VBW =100KHz, Swp. Time = 0.3 sec./MHz。 Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz,VBW=10Hz, Swp. Time =0.3 sec./MHz。
- (2) All readings are QP Mode value unless otherwise stated AVG in column of 'Note'。 If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform。 In this case, a " *" marked in AVG Mode column of Interference Voltage Measured。
- (3) Measuring frequency range from 150KHz to 30MHz。

Review:

Timothy Sw

Test Engr.:

Jason

Test Date :

Jul. 02, 2001

5. Radiated Emission Datas

5.1 The following data lists the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, as well as the limit. Explanation of the Correction Factor is given in paragraph 7.2.

Judgement: Passed by **-7.40 dB** in polarity of **Vertical** **209.43 MHz**
 Test Mode : 1600x1200/75Hz/60KHz/DVI

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Safe Margins (dBuV/m)	Note
75.51	H	39.07	- 18.37	20.70	30.00	- 9.30	(QP)
162.34	V	32.05	- 12.99	19.06	30.00	- 10.94	(QP)
163.03	H	30.80	- 13.03	17.77	30.00	- 12.23	(QP)
170.46	H	33.90	- 13.61	20.29	30.00	- 9.71	(QP)
178.97	V	34.97	- 14.43	20.54	30.00	- 9.46	(QP)
192.57	V	34.80	- 15.54	19.26	30.00	- 10.74	(QP)
203.79	V	37.97	- 15.91	22.06	30.00	- 7.94	(QP)
209.43	V	38.52	- 15.92	22.60	30.00	- 7.40	(QP)
209.64	H	32.90	- 15.92	16.98	30.00	- 13.02	(QP)
229.09	H	36.30	- 15.01	21.29	30.00	- 8.71	(QP)
229.09	V	34.32	- 15.01	19.31	30.00	- 10.69	(QP)
400.87	H	35.70	- 9.18	26.52	37.00	- 10.48	(QP)

Remark : :

- (1) Test Receiver or Spectrum Analyzer measurement condition setting are Res. BW=1 MHz, Video BW =1MHz , Sweep. Time = 0.2 sec./MHz
- (2) All readings are Peak unless otherwise stated QP in column of 'Note'
- (3) Measuring frequency range from 30MHz to 1000MHz.
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.
- (5) If the peak scan value lower limit less than 20dB, then this signal data will be listed. But if these signal datas more than 10 frequencies, then only the Top 10 be listed.

Review: Timothy Su Test Engr.: Jason Test Date : Jun. 29, 2001

5. Radiated Emission Datas

5.1 The following data lists the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, as well as the limit. Explanation of the Correction Factor is given in paragraph 7.2.

Judgement: Passed by **-2.49 dB** in polarity of **Horizontal** **229.07 MHz**
 Test Mode : 1600x1200/ 106KHz 85Hz/CRT

Freq. (MHz)	Ant. H/V	Reading(RA) (dBUV)	Corr.Factor(CF) (dB)	Measured(FS) (dBUV/m)	Limits(QP) (dBUV/m)	Safe Margins (dBUV/m)	Note
57.43	V	39.00	- 15.31	23.69	30.00	- 6.31	(QP)
72.29	V	40.12	- 17.87	22.25	30.00	- 7.75	(QP)
152.36	H	35.85	- 12.97	22.88	30.00	- 7.12	(QP)
163.14	H	34.22	- 13.04	21.18	30.00	- 8.82	(QP)
193.21	H	35.35	- 15.56	19.79	30.00	- 10.21	(QP)
193.80	V	36.27	- 15.58	20.69	30.00	- 9.31	(QP)
208.44	V	33.67	- 15.94	17.73	30.00	- 12.27	(QP)
216.24	H	31.90	- 15.66	16.24	30.00	- 13.76	(QP)
216.31	V	34.40	- 15.66	18.74	30.00	- 11.26	(QP)
229.07	H	42.52	- 15.01	27.51	30.00	- 2.49	(QP)
229.11	V	34.77	- 15.01	19.76	30.00	- 10.24	(QP)
458.20	H	32.27	- 7.51	24.76	37.00	- 12.24	(QP)

Remark: :

- (1) Test Receiver or Spectrum Analyzer measurement condition setting are Res. BW=1 MHz, Video BW =1MHz , Sweep. Time = 0.2 sec./MHz
- (2) All readings are Peak unless otherwise stated QP in column of 'Note'
- (3) Measuring frequency range from 30MHz to 1000MHz.
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.
- (5) If the peak scan value lower limit less than 20dB, then this signal data will be listed. But if these signal datas more than 10 frequencies, then only the Top 10 be listed.

Review: Timothy Su Test Engr.: Jason Test Date : Jun. 29, 2001

5-2. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor (1)

CL = Cable Attenuation Factor (1)

AG = Amplifier Gain (1) (2)

Remark :

(1) The Correction Factor = AF + CL - AG, as shown in the data tables' Correction Factor column.

(2) AG is not available for Neutron's Open Site Facility

Example of Calculation:

Assume a Receiver Reading of 23.7 dBuV is obtained with an Antenna Factor of 7.2 dB and a Cable Factor of 1.1 dB. Then:

1. The Correction Factor will be calculated by

$$\text{Correction Factor} = AF + CL - AG = 7.2 + 1.1 - 0 = 8.3 \text{ (dB)}$$

as shown in the data tables' Correction Factor column.

2. The Field Strength will be calculated by

$$FS = RA + \text{Correction Factor} = 23.7 + 8.3 = 32 \text{ (dBuV/m)}.$$

FS is the value shown in the data tables' Corrected Reading column and RA is the value shown in the data tables' Receiver Reading column. The 32 dBuV/m value was mathematically converted to its corresponding level in uV/m as:

$$\text{Log}^{-1}\{(32.0\text{dBuV/m})/20\} = 39.8 \text{ (uV/m)}$$

5-3. Correction Factor VS Frequency

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30.00	11.10	0.90
35.00	10.80	0.50
40.00	11.20	1.00
45.00	11.50	0.80
50.00	11.30	1.00
55.00	10.50	1.30
60.00	9.90	1.00
65.00	8.70	1.50
70.00	7.60	1.20
75.00	6.40	1.40
80.00	6.10	1.30
85.00	7.00	1.40
90.00	8.00	1.70
95.00	10.00	1.50
100.00	11.20	1.90
110.00	12.60	2.00
120.00	13.00	1.80
130.00	12.50	1.80
140.00	12.00	2.00
150.00	12.00	2.20
160.00	13.20	2.40
170.00	14.80	2.50
180.00	16.30	2.50
190.00	17.00	2.50
200.00	17.30	2.40
225.00	10.50	2.70
250.00	11.70	3.10
275.00	12.80	3.70
300.00	14.50	4.00
325.00	14.00	4.50
350.00	14.20	4.50
375.00	14.60	4.60
400.00	15.10	4.80
450.00	16.20	5.40
500.00	17.60	6.50
550.00	17.80	7.00
600.00	18.40	7.10
650.00	19.50	7.10
700.00	20.80	7.20
750.00	20.50	7.50
800.00	21.10	8.00
850.00	22.40	8.60
900.00	23.50	8.90
950.00	24.00	9.70
1000.00	24.80	10.30

6. Photos of Tested EUT:

- 1. Photo # 1 Front View, Rear View**
- 2. Photo # 2 Side View**

Attachment

User' s Manual

