FCC DoC
TEST REPORT

for

6 port 1U Firewall

MODEL: FWS-810

Test Report Number:
70126202-F

Issued to:

AAEON Technology Inc.
5F, No.135, Lane 235, Pao Chiao Rd., Hsin-Tien City,
Taipei, Taiwan, R.O.C.

Issued by:

Compliance Certification Services Inc.
Sindian BU
No.163-1, Jhongsheng Rd., Sindian City,
Taipei County 23151, Taiwan
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Issued Date: February 09, 2007

ACCREDITED No. 0824-01 ilac-MRA TAF Testing Laboratory 1108

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00				Initial Issue	ALL	

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1 TEST RESULT CERTIFICATION

Product:	6 port 1U Firewall
Brand:	AAEON
Model:	FWS-810
Applicant:	**AAEON Technology Inc.** 5F, No.135, Lane 235, Pao Chiao Rd., Hsin-Tien City, Taipei, Taiwan, R.O.C.
Manufacturer:	**AAEON Technology Inc.** 5F, No.135, Lane 235, Pao Chiao Rd., Hsin-Tien City, Taipei, Taiwan, R.O.C.
Tested:	January 26, 2007 & January 29, 2007

EMISSION			
Standard	**Item**	**Result**	**Remarks**
FCC 47 CFR Part 15 Subpart B, ICES-003 Issue 4 ANSI C63.4-2003	Conducted (Main Port)	PASS	Meet Class A limit
	Radiated	PASS	Meet Class A limit

Note: *1. The test result judgment is decided by the limit of measurement standard.*
2. The information of measurement uncertainty is available upon the customer's request.

Deviation from Applicable Standard
None

The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

David Wang
Manager of Sindian BU

Reviewed by:

Vince Chiang
Assistant Manager of Sindian BU

2 EUT DESCRIPTION

Product	6 port 1U Firewall
Brand Name	AAEON
Model	FWS-810
Test Item	Engineering sample
Applicant	AAEON Technology Inc.
Housing material	Metal case
EUT Type	☒Engineering Sample. ☐Product Sample. ☐Mass Product Sample.
Serial Number	N/A
Received Date	January 26, 2007
EUT Power Rating	100-240VAC, 6-3A, 60-50Hz
Power Supply Manufacturer	FSP
Power Supply Model Number	FSP250-601U
OSC/Clock Frequencies	32.768kHz; 14.31818MHz; 25MHz

I/O PORT

I/O PORT TYPES	Q'TY	TESTED WITH
1) SIO Port	1	1
2) LAN Port	6	6
3) USB Port	2	2

Note: *Client consigns only one model sample to test (Model Number: FWS-810).*

3 TEST METHODOLOGY

3.1. DECISION OF FINAL TEST MODE

The EUT was tested together with the above additional components, and a configuration, which produced the worst emission levels, was selected and recorded in this report.

The test configuration/ mode is as the following:

Conduction Mode:

1.	**NORMAL MODE**

Radiation Mode(s):

1.	**NORMAL MODE**
	NORMAL MODE / 1-14GHz

Conduction: Mode 1

Radiation: Mode 1

3.2. EUT SYSTEM OPERATION

1. Windows XP boots system.
2. Run Emctest.exe to activate all peripherals and display “H” pattern on monitor screen.
3. Run Winemc.exe and choose “F:/ & G:/” to test EUT.
4. Press the start menu, select executive and type ping 192.168.1.107–t (Server PC), ping 192.168.1.101~106 –t (EUT).

Note: *Test program is self-repeating throughout the test.*

4 SETUP OF EQUIPMENT UNDER TEST

4.1. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

EUT Devices:

No.	Equipment	Model No.	Trade Name
1.	CPU (2.8GHz)	Pentium 4	Intel
2.	Memory (DDR400 / SDRM256M)	HY5DU56822BT-D43	Hynix
3.	Power Adapter	FSP250-601U	FSP
4.	SATA Hard Disk (80GB)	WD800JD-00LSA0	Western Digital

Peripherals Devices:

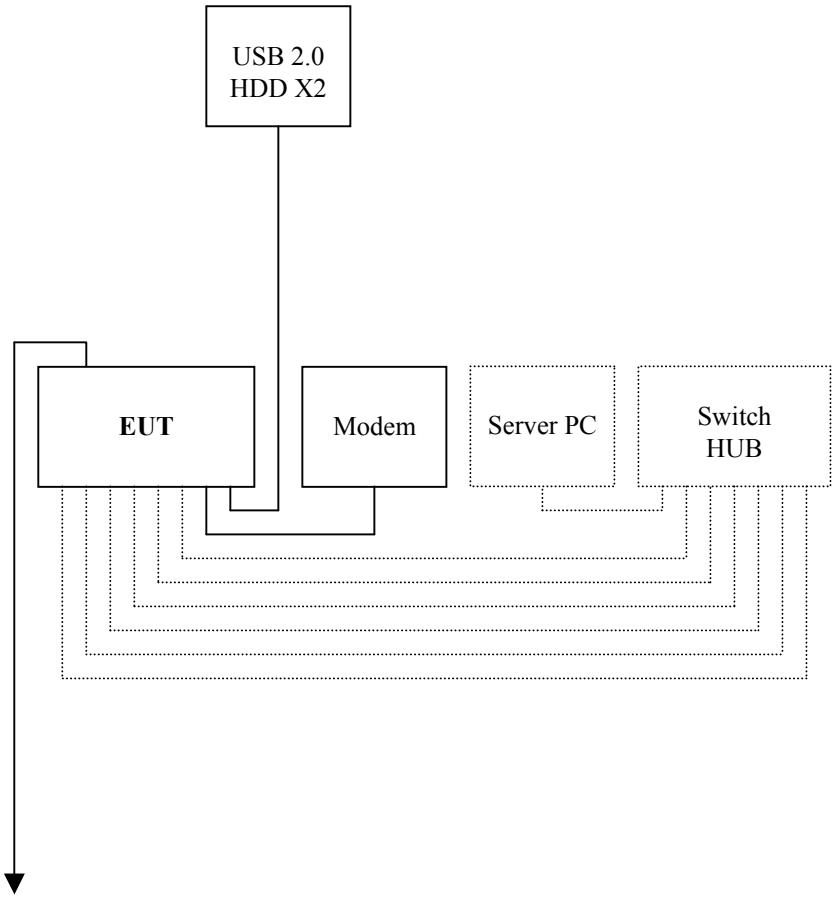
No.	Equipment	Model No.	Serial No.	FCC ID / BSMI ID	Trade Name	Data Cable	Power Cord
1.	USB 2.0 HDD	F12-U	N/A	BSMI ID: 4912A002	Terasys	Shielded, 1.8m	N/A
2.	USB 2.0 HDD	F12-U	N/A	BSMI ID: 4912A002	Terasys	Shielded, 1.8m	N/A
3.	Modem	5JEG4033MKO	N/A	5RJTAI-35500-M5-E	TOP-SOLUTION	Shielded, 1.8m	Unshielded, 1.8m
4.	Server PC	DCNE	CV8DH1S	BSMI: R33002	DELL	Unshielded, 1.0m	Unshielded, 1.8m
5.	Switch HUB	DGS-1008D	042829	DoC	D-Link	Unshielded, 20m X6	Unshielded, 1.8m

Note:

1) All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.2. CONFIGURATION OF SYSTEM UNDER TEST



5 FACILITIES AND ACCREDITATIONS

5.1. FACILITIES

All measurement facilities used to collect the measurement data are located at
CCS Taiwan Sindian BU at No.163-1, Jhongsheng Rd., Sindian City, Taipei County 23151, Taiwan.

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	FCC, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA
Taiwan	TAF, BSMI

Copies of granted accreditation certificates are available for downloading from our web site, http://www.ccsemc.com.tw

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency		Uncertainty
Conducted emissions	9kHz~30MHz		± 3.4508
Radiated emissions	Horizontal	30MHz ~ 200MHz	± 4.3799
		200MHz ~1000MHz	± 4.5147
	Vertical	30MHz ~ 200MHz	± 4.5015
		200MHz ~1000MHz	± 4.5073

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

6 CONDUCTED EMISSION MEASUREMENT

6.1. LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

***NOTE**:*
(1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
(3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

6.2. TEST INSTRUMENTS

Conducted Emission room # A				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
TEST RECEIVER	R&S	ESHS20	840455/006	02/06/2007
LISN (EUT)	SCHWARZBECK	NSLK 8127	8127382	12/06/2007
LISN	SOLAR	8012-50-R-24-BNC	8305114	12/26/2007
BNC CABLE	JYE BAO	RG-223/U	BNC A2	10/10/2007
THERMO-HYGRO METER	TOP	HA-202	9303-1	02/22/2007
Test S/W	EMI 32.exe			

***NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.*
2. N.C.R = No Calibration Request.

6.3. TEST PROCEDURES (please refer to measurement standard or CCS SOP PA-031)

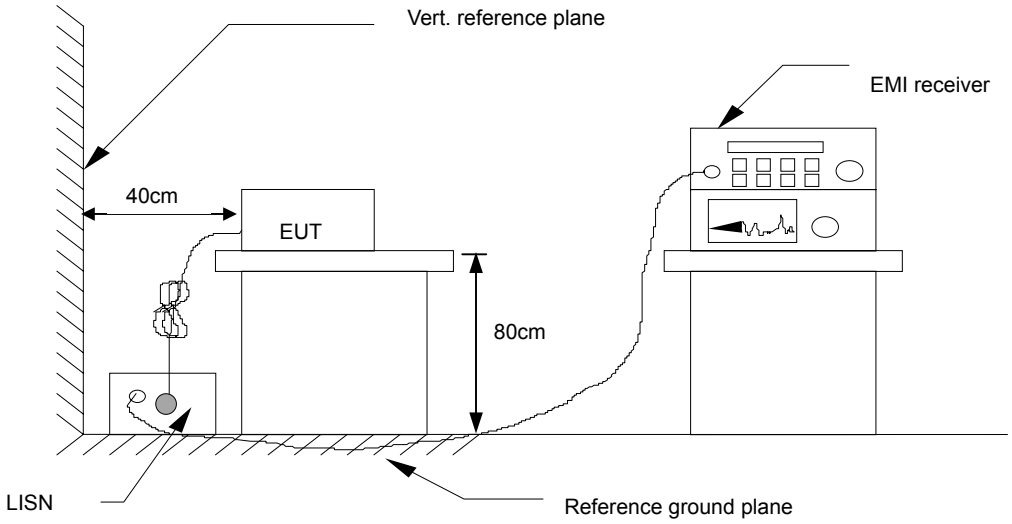
Procedure of Preliminary Test

- The EUT and Support equipment, if needed, was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor standing equipment, it is placed on the ground plane, which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- The test equipment EUT installed received AC main power, through a Line Impedance Stabilization Network (LISN), which supplied power source and was grounded to the ground plane.
- All support equipment power received from a second LISN.
- The EUT test program was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
- The Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- During the above scans, the emissions were maximized by cable manipulation.
- The test mode(s) described in Item 3.1 were scanned during the preliminary test.
- After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.
- The EUT configuration and cable configuration of the above highest emission levels were recorded for reference of the final test.

Procedure of Final Test

- EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.
- The test data of the worst-case condition(s) was recorded.

6.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

6.5. DATA SAMPLE

Freq. MHz	Read Level dBuV	Factor dB	Level dBuV	Limit dBuV	Over Limit dB	Reading Type (P/Q/A)	Line (L1/L2)
x.xx	42.95	0.55	43.50	73	-29.50	Q	L1

Freq. = Emission frequency in MHz
Read Level = Uncorrected Analyzer/Receiver reading
Factor = Insertion loss of LISN + Cable Loss
Level = Read Level + Factor
Limit = Limit stated in standard
Over Limit = Reading in reference to limit
P = Peak Reading
Q = Quasi-peak Reading
A = Average Reading
L1 = Hot side
L2 = Neutral side

Calculation Formula

Over Limit (dB) = Level (dBuV) – Limit (dBuV)

6.6. TEST RESULTS

Model No.	FWS-810	**6dB Bandwidth**	10 KHz
Environmental Conditions	21°C, 61% RH, 1010mbar	**Test Mode**	Mode 1
Tested by	John Yen		

(The chart below shows the highest readings taken from the final data.)

Six Highest Conducted Emission Readings							
Frequency Range Investigated				**150 KHz to 30 MHz**			
Freq (MHz)	Read Level (dBuV)	Factor (dB)	Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Reading Type (P/Q/A)	Line (L1/L2)
0.198	**44.90**	**0.42**	**45.32**	**79.00**	**-33.68**	**P**	**L1**
3.901	**39.41**	**0.77**	**40.18**	**73.00**	**-32.82**	**P**	**L1**
12.253	**36.87**	**1.24**	**38.11**	**73.00**	**-34.89**	**P**	**L1**
0.198	**44.40**	**0.15**	**44.55**	**79.00**	**-34.45**	**P**	**L2**
3.681	**38.06**	**0.35**	**38.41**	**73.00**	**-34.59**	**P**	**L2**
12.060	**37.08**	**0.86**	**37.95**	**73.00**	**-35.05**	**P**	**L2**

NOTE: *1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)*
2. The emission level was or more than 2dB below the Average limit, so no re-check anymore.

7 RADIATED EMISSION MEASUREMENT

7.1. LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	dBuV/m (At 10m)	
	Class A	Class B
30 ~ 230	40	30
230 ~ 1000	47	37

***NOTE**: (1) The lower limit shall apply at the transition frequencies.*
(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

7.2. TEST INSTRUMENTS

Open Area Test Site # I				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
SITE NSA	CCS	I Site	N/A	10/13/2007
MEASURE RECEIVER	SCHAFFNER	SCR3501	338	07/02/2007
SPECTRUM ANALYZER	ADVANTEST	R3132	120900008	No Calibration Required
ANTENNA	SCHAFFNER	CBL 6112B	2809	09/22/2007
AMPLIFIER	SCHAFFNER	CPA9231A	3626	10/10/2007
CABLE	BELDEN	9913	N-TYPE #I2	02/17/2007
ATTENUATOR	MCL	UNAT-6	AT06-3	10/10/2007
THERMO-HYGRO METER	TFA	N/A	NO.2	10/26/2007
Test S/W	Lab VIEW 7.1			

***NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.*
2. N.C.R = No Calibration Request.

7.3. TEST PROCEDURES (please refer to measurement standard or CCS SOP PA-031)

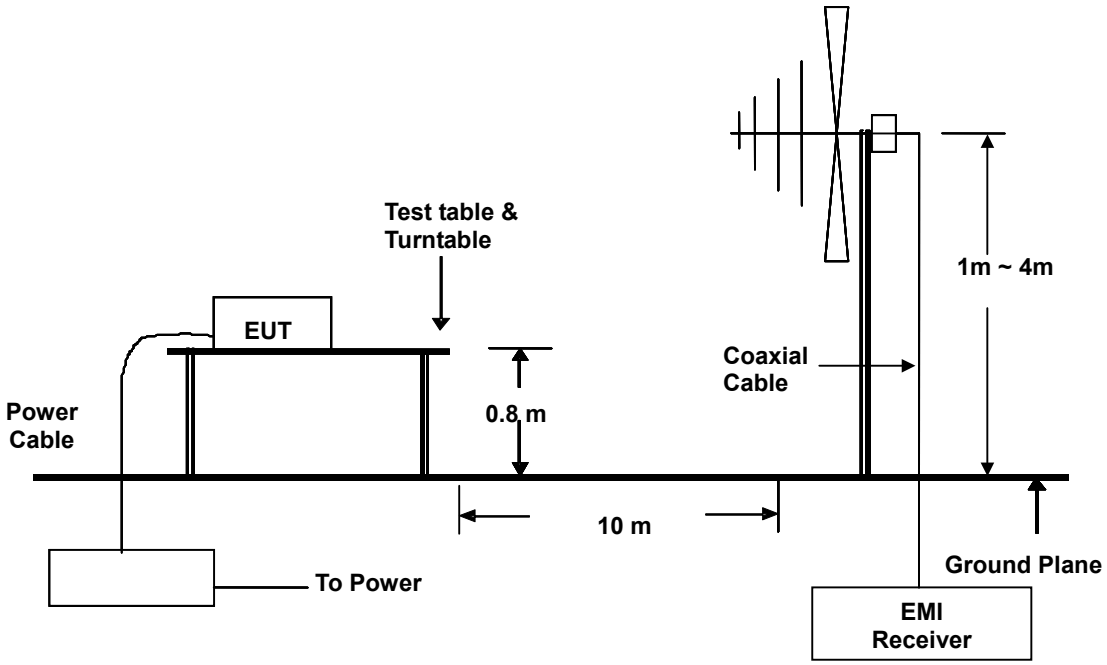
Procedure of Preliminary Test

- The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per ANSI C63.4.
- All I/O cables were positioned to simulate typical usage as per ANSI C63.4.
- The EUT received AC power source from the outlet socket under the turntable. All support equipment power received from another socket under the turntable.
- The antenna was placed at 10 meter away from the EUT as stated in ANSI C63.4. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.
- The Analyzer / Receiver quickly scanned from 30MHz to 14000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- The test mode(s) described in Item 3.1 were scanned during the preliminary test:
- After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.
- The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

Procedure of Final Test

- EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.
- The Analyzer / Receiver scanned from 30MHz to 14000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.
- The test data of the worst-case condition(s) was recorded.

7.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.5. DATA SAMPLE

Freq. MHz	Read Level dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over Limit dB	Reading Type (P/Q/A)	Pol. (H/V)
x.xx	14.0	12.2	26.2	40	-13.8	Q	H

Freq. = Emission frequency in MHz
Read Level = Uncorrected Analyzer/Receiver reading
Factor = Antenna Factor + Cable Loss + Attenuator (3/6/10dB) – Amplifier Gain
Level = Read Level + Factor
Limit = Limit stated in standard
Over Limit = Reading in reference to limit
P = Peak Reading
Q = Quasi-peak Reading
A = Average Reading
H = Antenna Polarization: Horizontal
V = Antenna Polarization: Vertical

Calculation Formula

Over Limit (dB) = Level (dBuV/m) – Limit (dBuV/m)

7.6. TEST RESULTS

Model No.	FWS-810	**Test Mode**	Mode 1
Environmental Conditions	20°C, 60% RH, 1006mbar	**6dB Bandwidth**	120 KHz
Antenna Pole	Vertical	**Antenna Distance**	10m
Detector Function	Quasi-peak.	**Tested by**	Stanley Cheng

(The chart below shows the highest readings taken from the final data.)

Six Highest Radiated Emission Readings							
Frequency Range Investigated				**30 MHz to 1000 MHz at 10m**			
Freq (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Reading Type (P/Q/A)	Pol. (H/V)
44.470	**38.40**	**-11.45**	**26.95**	**40.00**	**-13.05**	**Q**	**V**
124.995	**36.00**	**-8.73**	**27.27**	**40.00**	**-12.73**	**Q**	**V**
300.535	**37.60**	**-5.21**	**32.39**	**47.00**	**-14.61**	**Q**	**V**
466.810	**34.30**	**-0.83**	**33.47**	**47.00**	**-13.53**	**Q**	**V**
480.080	**36.60**	**-0.48**	**36.12**	**47.00**	**-10.88**	**Q**	**V**
720.040	**29.60**	**3.57**	**33.17**	**47.00**	**-13.84**	**Q**	**V**

REMARKS: *1. 30MHz to 1000MHz test is Applicable CISPR 22 / EN 55022 standard.*
2. The other emission levels were very low against the limit.
3. P= Peak Reading; Q= Quasi-peak Reading A= Average Reading

Model No.	FWS-810	**Test Mode**	Mode 1
Environmental Conditions	20°C, 60% RH, 1006mbar	**6dB Bandwidth**	120 KHz
Antenna Pole	Horizontal	**Antenna Distance**	10m
Detector Function	Quasi-peak.	**Tested by**	Stanley Cheng

(The chart below shows the highest readings taken from the final data.)

Six Highest Radiated Emission Readings							
Frequency Range Investigated				**30 MHz to 1000 MHz at 10m**			
Freq (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Reading Type (P/Q/A)	Pol. (H/V)
44.580	**39.00**	**-11.53**	**27.47**	**40.00**	**-12.53**	**Q**	**H**
125.005	**35.90**	**-8.73**	**27.17**	**40.00**	**-12.83**	**Q**	**H**
466.780	**33.30**	**-0.83**	**32.47**	**47.00**	**-14.53**	**Q**	**H**
499.940	**32.90**	**0.05**	**32.95**	**47.00**	**-14.05**	**Q**	**H**
598.305	**33.70**	**2.92**	**36.62**	**47.00**	**-10.38**	**Q**	**H**
720.075	**31.60**	**3.57**	**35.17**	**47.00**	**-11.83**	**Q**	**H**

REMARKS: *1. 30MHz to 1000MHz test is Applicable CISPR 22 / EN 55022 standard.*
2. The other emission levels were very low against the limit.
3. P= Peak Reading; Q= Quasi-peak Reading A= Average Reading

8 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

RADIATED EMISSION TEST