

RF Maximum Permissible Exposure Measurement Report

of

E.U.T. : Wireless Outdoor Bridge
FCC ID. : NI3-2511BG2PLUS
MODEL : SL-2511BG2 PLUS

for

APPLICANT : SENAO INTERNATIONAL CO., LTD.

ADDRESS : 2F, NO. 531, CHUNG CHENG RD., HSIN-TIEN,
TAIPEI, TAIWAN, R.O.C.

Test Performed by

ELECTRONICS TESTING CENTER, TAIWAN
NO. 34, LIN 5, DING FU TSUN, LINKOU HSIANG,
TAIPEI HSIE, TAIWAN, R.O.C.

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Report Number : ET91R-08-058-01

TEST REPORT CERTIFICATION

Applicant : SENAO INTERNATIONAL CO., LTD.
2F, NO. 531, CHUNG CHENG RD., HSIN-TIEN, TAIPEI, TAIWAN,
R.O.C.

Manufacturer : SENAO INTERNATIONAL CO., LTD.
2F, NO. 531, CHUNG CHENG RD., HSIN-TIEN, TAIPEI, TAIWAN,
R.O.C.

Description of EUT :
a) Type of EUT : Wireless Outdoor Bridge
b) Trade Name : SENAO
c) Model No. : SL-2511BG2 PLUS
d) Power Supply : 48 VDC

Regulation Applied : IEEE C95.1-1991, FCC 47 CFR Part 1 and Part 2

I HEREBY CERTIFY THAT: The data shown in this report were made in accordance with the procedures given in IEEE C95.1, and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note: 1. The result of the testing report relates only to the item tested.
2. The testing report shall not be reproduced expect in full, without the written approval of ETC.

Issued Date : Jan. 03, 2003

Test Engineer : S. S. Liou
(S. S. Liou)

Approve & Authorized Signer : Will Yau
Will Yau, Manager
EMC Dep. II of ELECTRONICS
TESTING CENTER, TAIWAN

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1 GENERAL INFORMATION

1.1 Product Description

- a) Type of EUT : Wireless Outdoor Bridge
- b) Trade Name : SENAO
- c) Model No. : SL-2511BG2 PLUS
- d) Power Supply : 48 VDC

1.2 Characteristics of Device

This wireless bridge offers a low-cost alternative to installing cable or dedicated telephone lines. You can connect two or more buildings quickly and easily with no expensive, time-consuming cable installation and no monthly service fees (unlike leased 56K, ISDN or T1 lines). The wireless bridges establish radio links between two or more networks up to 25 km and transmit data between buildings faster than T1 lines allowing users to gain Internet access, email and network resources located in different buildings easily and efficiently.

This wireless bridge radio operates in the 2.4GHz frequency band and uses advanced Direct Sequence Spread Spectrum technology to provide high-speed and secure connectivity between multiple locations. This wireless bridge uses a browser-base management system. The system settings are no web pages. Before you install and use this product, please read this manual carefully for fully functions of this product.

1.3 Test Methodology

The Maximum Permissible Exposure (MPE) was performed according to the procedures illustrated in IEEE C95.1-1991.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the roof top of Building at No.34, Lin 5, Ding Fu Tsun, Linkou Hsiang, Taipei Hsien, Taiwan, R.O.C.

This site has been fully described in a report submitted to the FCC, and accepted in a letter dated Feb. 10, 2000.

2 PROVISIONS APPLICABLE

2.1 Definition

MPE in Occupational / Controlled Environments:

Persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Also apply to an individual is transient through a location where occupational / controlled limits apply provided he or she is made aware of the potential for exposure.

MPE in General Population / Uncontrolled Environments:

General population / Uncontrolled exposure apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

2.2 Relative Requirement for Compliance

(1) MPE for Controlled Environments

According to section 1.1310 of FCC 47 CFR Part 1, MPE Limits for controlled environments are as follows:

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3-3.0	614	1.63	*100	6
3-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1500	-----	-----	f/300	6
1500-100,000	-----	-----	5.0	6

(2) MPE for Uncontrolled Environments

According to section 1.1310 of FCC 47 CFR Part 1, MPE Limits for uncontrolled environments are as follows:

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3-3.0	614	1.63	*100	30
3-30	1842/f	4.89/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1500	-----	-----	f/1500	30
1500-100,000	-----	-----	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a typical fashion, as a customer would normally use it. The MPE measurement was performed under the setting of maximum RF transmitting power and maximum transmission data rate of 11 Mbps. And measured on lowest, middle, and highest frequencies to demonstrate the whole used band is complied with the requirement. Further, measurement was made on every possible azimuth around the transmitting structure. Therefore, we can make sure that the MPE testing was performed under the worst case.

3.2 Devices for Tested System

Device	Manufacture	Model	Cable Description
Wireless Outdoor Bridge *	SENAO INTERNATIONAL CO., LTD.	SL-2511BG2 PLUS	----
Printer	Hewlett-Packard	2225C+	1.2m Shielded Cable
Notebook PC	ASUS	L14100	2.5m Unshielded AC Adaptor Power Cord

Remark “*” means device under test.

4 Maximum Permissible Exposure Measurements

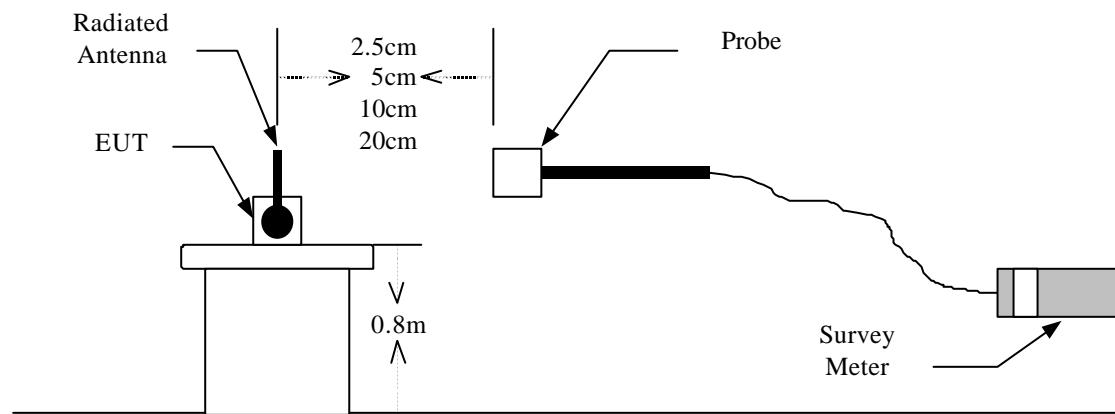
4.1 Applicable Standard

For this intentional radiator is used with any possible people, therefore the **Uncontrolled Environment Condition** is applied. And the MPE requirement is as described in section 2.2 of this test report.

4.2 Measurement Procedure

- (1) Set up the device under test (DUT) as its normal using configuration. Please see figure 1.
- (2) Calibrate the probe system so that the meter displays zero, and then power on the DUT.
- (3) Scan the antenna of DUT with a proper spacer of 2.5 cm in vertical axis and keep vertical scanning around the antenna, and pick up the maximum data with Max. Hold function.
- (4) Repeat step (3) by changing the spacer to 5 cm, 10 cm and then 20 cm till the field from DUT is too weak to be measured.
- (5) Record the maximum value appeared.

Figure 1: Measurement configuration



4.3 Measurement Instrument

The following instrument are used for radiated emissions measurement :

Equipment	Manufacturer	Model No.	Next Cal. Due
Survey Meter	Narda	8712	Jan. 30, 2003
Probe	Narda	8721D	Jan. 30, 2003

4.4 Power Desity Data

A. Channel 1

Operation Mode : 11 Mbps Data Transmitting Rate
 Transmitting Frequency : 2412 MHz
 Rated Maximum Output Power : 27.8 dBm
 Test Date : Jan. 03, 2003 Temperature : 22 Humidity : 70%

Measured @ 2.5cm mW/cm ²	Measured @ 5cm mW/cm ²	Measured @ 10cm mW/cm ²	Measured @ 15cm mW/cm ²	Measured @ 20cm mW/cm ²	Probe Factor	Maximum Result @2.5cm mW/ cm ²	MPE Limit mW/cm ²
0.972	0.741	0.430	0.372	0.295	0.82	0.797	1.0

B. Channel 6

Operation Mode : 11 Mbps Data Transmitting Rate
 Transmitting Frequency : 2437 MHz
 Rated Maximum Output Power : 25.5 dBm
 Test Date : Jan. 03, 2003 Temperature : 22 Humidity : 70%

Measured @ 2.5cm mW/cm ²	Measured @ 5cm mW/cm ²	Measured @ 10cm mW/cm ²	Measured @ 15cm mW/cm ²	Measured @ 20cm mW/cm ²	Probe Factor	Maximum Result @2.5cm mW/ cm ²	MPE Limit mW/cm ²
0.925	0.704	0.418	0.366	0.279	0.82	0.759	1.0

C. Channel 11

Operation Mode : 11 Mbps Data Transmitting Rate
 Transmitting Frequency : 2462 MHz
 Rated Maximum Output Power : 22.7 dBm
 Test Date : Jan. 03, 2003 Temperature : 22 Humidity : 70%

Measured @ 2.5cm mW/cm ²	Measured @ 5cm mW/cm ²	Measured @ 10cm mW/cm ²	Measured @ 15cm mW/cm ²	Measured @ 20cm mW/cm ²	Probe Factor	Maximum Result @2.5cm mW/ cm ²	MPE Limit mW/cm ²
0.908	0.700	0.389	0.342	0.255	0.82	0.745	1.0

Note :

1. Remark “---” means that the emission level is too low to be measured (the precise accuracy of the measurement system is 0.01 mW/ cm²).
2. Value 0.82 is a corrected factor of measurement system.
3. Result = Value Measured X Corrected Factor.
4. The measurement was performed under the condition of fixed the emission frequency to get the most extreme MPE.

4.5 Measurement Setup Photos

