



RF EXPOSURE REPORT

REPORT NO.: SA971117L03

MODEL NO.: EOC-2610

ACCORDING: FCC Guidelines for Human Exposure
IEEE C95.1

APPLICANT: Senao Networks Inc.

ADDRESS: 3F, No. 529, Chung Cheng Rd., Hsintien, Taipei,
Taiwan, R.O.C.

ISSUED BY: Bureau Veritas Consumer Products Services
(H.K.) Ltd., Taoyuan Branch

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou
Hsiang, Taipei Hsien 244, Taiwan, R.O.C.

TEST LOCATION: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei
Shan Hsiang, Taoyuan Hsien 333, Taiwan,
R.O.C.



RF EXPOSURE MEASUREMENT (MOBILE DEVICE)

1. INTRODUCTION

In this document, we try to prove the safety of radiation harmfulness to the human body for our product. The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. The Gain of the antenna used in this product is measured in a Fully Anechoic Chamber (FAC) calibrated for antenna measurement in ADT, and also the maximum total power input to the antenna is measured. Through the Friis transmission formula and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis transmission formula is a far field assumption, the calculated result of that is an over-prediction for near field power density. We will take that as the worst case to specify the safety range.

2. RF EXPOSURE LIMIT

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

FREQUENCY RANGE (MHz)	ELECTRIC FIELD STRENGTH (V/m)	MAGNETIC FIELD STRENGTH (A/m)	POWER DENSITY (mW/cm ²)	AVERAGE TIME (minutes)
(A)LIMITS FOR OCCUPATIONAL / CONTROL EXPOSURES				
300-1500	F/300	6
1500-100,000	5	6
(B)LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE				
300-1500	F/1500	30
1500-100,000	1.0	30

F = Frequency in MHz



3. FRIIS FORMULA

Friis transmission formula : $P_d = (P_{out} * G) / (4 * \pi * r^2)$

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

If we know the maximum Gain of the antenna and the total power input to the antenna, through the calculation, we will know the MPE value at distance r .

Ref.: David K. Cheng, *Field and Wave Electromagnetics*, Second Edition,

Page 640, Eq. (11-133).

4. EUT OPERATING CONDITION

The software provided by Manufacturer enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

5. CLASSIFICATION

The antenna of the product, under normal use condition, is at least 20.5cm far away from the body of the user. Warning statement to the user for keeping at least 20.5cm or more separation distance with the antenna should be included in users manual. So, this device is classified as **Mobile Device**.

6. TEST RESULTS

6.1 ANTENNA GAIN

The maximum Gain measured in Fully Anechoic Chamber are 10dBi or 10 (numeric) and 7dBi or 5.012 (numeric).

6.2 OUTPUT POWER INTO ANTENNA & RF EXPOSURE VALUE AT DISTANCE 20.5cm:

Internal Antenna (Patch) with 10dBi gain
802.11b DSSS MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	POWER DENSITY (mW/CM ²)	LIMIT OF POWER DENSITY (mW/CM ²)
1	2412	142.561	21.54	0.270	1.000
6	2437	504.661	27.03	0.956	1.000
11	2462	144.212	21.59	0.273	1.000

802.11g OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	POWER DENSITY (mW/CM ²)	LIMIT OF POWER DENSITY (mW/CM ²)
1	2412	201.372	23.04	0.381	1.000
6	2437	510.505	27.08	0.967	1.000
11	2462	200.447	23.02	0.380	1.000



External Antenna (Dipole) with 7dBi gain
802.11b DSSS MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	POWER DENSITY (mW/CM ²)	LIMIT OF POWER DENSITY (mW/CM ²)
1	2412	142.561	21.54	0.135	1.000
6	2437	504.661	27.03	0.479	1.000
11	2462	144.212	21.59	0.137	1.000

802.11g OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	POWER DENSITY (mW/CM ²)	LIMIT OF POWER DENSITY (mW/CM ²)
1	2412	201.372	23.04	0.191	1.000
6	2437	510.505	27.08	0.484	1.000
11	2462	200.447	23.02	0.190	1.000