

# RF Exposure Evaluation declaration

Product Name : 802.11bgn Module

Model No. : 1103WL

FCC ID : BDN1103WL

Applicant : Zoom Telephonics, Inc.

Address : 207 South Street Boston, Ma. 02111

Date of Receipt : May. 02, 2012

Date of Declaration : Jul. 25, 2012

Report No. : 127458R-RFUSP42V01

The declaration results relate only to the samples calculated.

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## 1. RF Exposure Evaluation

### 1.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment 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 <sup>2</sup> )	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 Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

Friis Formula

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

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

$\pi$  = 3.1416

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

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

### 1.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 18°C and 78% RH.

### 1.3. Test Result of RF Exposure Evaluation

Product : 802.11bgn Module  
 Test Item : RF Exposure Evaluation  
 Test Site : No.3 OATS

#### (802.11b) Output Power Into Antenna & RF Exposure Evaluation Distance (4.2dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
01	2412.00	190.5461	0.099708
06	2437.00	194.9845	0.102031
11	2462.00	186.2087	0.097438

Power density in column 4 is much lower than the limit (1 mW/cm<sup>2</sup>).

#### (802.11g) Output Power Into Antenna & RF Exposure Evaluation Distance (4.2dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
01	2412.00	392.6449	0.205462
06	2437.00	399.0249	0.208800
11	2462.00	396.2780	0.207363

Power density in column 4 is much lower than the limit (1 mW/cm<sup>2</sup>).

#### (802.11n-20) Output Power Into Antenna & RF Exposure Evaluation Distance (4.2dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
01	2412.00	570.1643	0.298353
06	2437.00	535.7967	0.280369
11	2462.00	552.0774	0.288889

Power density in column 4 is much lower than the limit (1 mW/cm<sup>2</sup>).

#### (802.11n-40) Output Power Into Antenna & RF Exposure Evaluation Distance (4.2dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
03	2422.00	439.5416	0.230001
06	2437.00	489.7788	0.256289
09	2452.00	494.3107	0.258661

Power density in column 4 is much lower than the limit (1 mW/cm<sup>2</sup>).