

# RF Exposure Evaluation Declaration

**Product: Wireless router with VDSL2/ADSL broadband access**

**Test Item: RF Exposure Evaluation Declaration**

## 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. EUT Operation condition

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

## 1.4. Test Result of RF Exposure Evaluation

### Antenna Gain:

Ant0:

antenna type: Dipole antenna antenna

antenna gain: 1.8dBi

Ant1:

antenna type: Dipole antenna antenna

antenna gain: 2.0dBi

### Output Power Into Antenna & RF Exposure Evaluation Distance:

1) 802.11b

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
01	2412.00	233.8837	0.0737444
06	2437.00	207.9697	0.0655736
11	2462.00	190.1078	0.0599417

2) 802.11g

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
01	2412.00	155.9553	0.049173
06	2437.00	168.6553	0.053178
11	2462.00	165.9587	0.052327

3) 802.11n(20MHz)

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
01	2412.00	358.0964	0.112909
06	2437.00	370.6807	0.116877
11	2462.00	351.5604	0.118048

4) 802.11n(40MHz)

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
03	2422.00	372.3917	0.117417
06	2437.00	380.1894	0.119875
09	2452.00	395.3666	0.124661

Note:

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm<sup>2</sup>.