

# RF Exposure Evaluation Declaration

**Product: Wireless N FTTH Router**

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

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: 5.7dBi

Ant1:

antenna type: Dipole antenna antenna

antenna gain: 5.7dBi

### 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/cm2)
01	2412.00	120.5036	0.0890695
06	2437.00	118.0321	0.0872427
11	2462.00	108.3927	0.0801178

2) 802.11g

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
01	2412.00	149.9685	0.1108483
06	2437.00	169.0441	0.1249480
11	2462.00	145.5459	0.1075794

3) 802.11n(20MHz) (An0)

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
01	2412.00	204.6445	0.1512618
06	2437.00	190.1078	0.1405171
11	2462.00	168.6553	0.1246606

4) 802.11n(20MHz) (An1)

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
01	2412.00	151.7050	0.1121319
06	2437.00	159.2209	0.1176872
11	2462.00	141.2538	0.1044069

3) 802.11n(20MHz) (An1 and An0)

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
01	2412.00	356.4511	0.263469
06	2437.00	349.1403	0.258065
11	2462.00	309.7419	0.228944

5) 802.11n(40MHz) (An0)

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
03	2422.00	106.1696	0.0784746
06	2437.00	98.8553	0.0730683
09	2452.00	94.1890	0.0696193

6) 802.11n(40MHz) (An1)

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	137.0882	0.1013279
06	2437.00	133.0454	0.0983397
09	2452.00	127.0574	0.0939137

7) 802.11n(40MHz) (An1 and An0)

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	243.2204	0.1797749
06	2437.00	231.7395	0.1712889
09	2452.00	221.3095	0.1635796

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>.