

RF Exposure Evaluation Declaration

Product: 802.11n Dual ADSL 2+ 4-port Gateway

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 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 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/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

P_d is the limit of MPE, 1 mW/cm². 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 gain:3.0dBi

Ant1:

antenna type: Dipole 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 ²) |
|---------|-------------------------|------------------------------|--|
| 01 | 2412.00 | 57.9429 | 0.0230001 |
| 06 | 2437.00 | 52.9663 | 0.0210247 |
| 11 | 2462.00 | 50.2343 | 0.0199402 |

2) 802.11g

Test date:

| Channel | Channel Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-------------------------|------------------------------|--|
| 01 | 2412.00 | 90.9913 | 0.0361184 |
| 06 | 2437.00 | 85.1138 | 0.0337854 |
| 11 | 2462.00 | 103.5142 | 0.0410893 |

3) 802.11n(20MHz) (An0)

Test date:

| Channel | Channel Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-------------------------|------------------------------|--|
| 01 | 2412.00 | 68.0769 | 0.0270227 |
| 06 | 2437.00 | 45.1856 | 0.0179362 |
| 11 | 2462.00 | 56.2341 | 0.0223218 |

4) 802.11n(20MHz) (An1)

Test date:

| Channel | Channel Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-------------------------|------------------------------|--|
| 01 | 2412.00 | 63.9735 | 0.0253939 |
| 06 | 2437.00 | 76.5597 | 0.0303899 |
| 11 | 2462.00 | 71.1214 | 0.0282312 |

5) 802.11n(20MHz) (An0 and An1)

Test date:

| Channel | Channel Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-------------------------|------------------------------|--|
| 01 | 2412.00 | 132.1296 | 0.0524480 |
| 06 | 2437.00 | 121.6186 | 0.0482758 |
| 11 | 2462.00 | 127.3503 | 0.0505509 |

6) 802.11n(40MHz) (An0)

Test date:

| Channel | Channel Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-------------------------|------------------------------|--|
| 03 | 2422.00 | 70.6318 | 0.0280369 |
| 06 | 2437.00 | 52.7230 | 0.0209281 |
| 09 | 2452.00 | 65.0130 | 0.0258065 |

7) 802.11n(40MHz) (An1)

Test date:

| Channel | Channel Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-------------------------|------------------------------|--|
| 03 | 2422.00 | 86.8960 | 0.0344928 |
| 06 | 2437.00 | 65.4636 | 0.0259854 |
| 09 | 2452.00 | 63.3870 | 0.0251611 |

8) 802.11n(40MHz) (An0 and An1)

Test date:

| Channel | Channel Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-------------------------|------------------------------|--|
| 03 | 2422.00 | 157.3983 | 0.0624783 |
| 06 | 2437.00 | 118.3042 | 0.0469601 |
| 09 | 2452.00 | 128.5287 | 0.0510187 |