

RF Exposure Evaluation declaration

Product Name : Gigabit Wireless-N Router
Model No. : RT-N15U
FCC ID. : MSQ-RTN15U

Applicant : ASUSTeK COMPUTER INC.

Address : No. 15, Li-Te Rd., Peitou, Taipei 112, Taiwan R.O.C.

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Report No. : 118108R-RF-US-Exp
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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 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: $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

Pd = power density in mW/cm²

Pout = 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

Pd 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. Test Result of RF Exposure Evaluation

Product	Gigabit Wireless-N Router
Test Mode	Mode 1: Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.89dBi or 1.95 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11b			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412	199.9862	0.07758
6	2437	148.2518	0.05751
11	2462	140.2814	0.05442

IEEE 802.11g			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412	257.6321	0.09995
6	2437	373.2502	0.14480
11	2462	316.9567	0.12296

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/cm².

Product	Gigabit Wireless-N Router
Test Mode	Mode 1: Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber are 2.89dBi or 1.95 in linear scale (Antenna 0); 2.51 dBi or 1.78 in linear scale (Antenna 1), the maximum Gain is 5.71 dBi or 3.73 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11n (20MHz)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412	605.3409	0.44920
6	2437	668.3439	0.49595
11	2462	729.4575	0.54130

IEEE 802.11n (40M)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
3	2422	258.8213	0.19206
6	2437	642.6877	0.47691
9	2452	384.5918	0.28539

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/cm².