RF Exposure Evaluation declaration

Product Name ：Wireless N Router with All-in-One Printer Server
Model No. ：RT-N13U
FCC ID. ：MSQ-RTN13U

Applicant：ASUSTeK COMPUTER INC.
Address ：No. 15, Li-Te Rd., Peitou, Taipei 112,Taiwan

Date of Receipt : 2009/03/31
Date of Declaration : 2009/04/23
Report No. : 094062R-RF-US-Exp
Report Version : V1.0

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: $Pd = (Pout*G)/(4*pi*r^2)$

Where

Pd = power density in mW/cm^2

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 id the limit of MPE, 1 mW/cm^2. 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℃ and 78% RH.

1.3. Test Result of RF Exposure Evaluation

Product	Wireless N Router with All-in-One Printer Server
Test Mode	Mode 1: Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.77dBi or 1.892 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	158.4893	0.05966
6	2437	165.1962	0.06218
11	2462	157.7611	0.05938

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	359.7493	0.13541
6	2437	359.7493	0.13541
11	2462	337.2873	0.12696

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^2.

Product	Wireless N Router with All-in-One Printer Server
Test Mode	Mode 1: Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.77dBi or 1.892 in linear scale. IEEE 802.11n (ANT A (20M) / ANT A (40M))

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.85dBi or 2.427 in linear scale. IEEE 802.11n (ANT B (20M) / ANT B (40M))

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11n (ANT A (20MHz) / ANT B (20MHz))			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
1	2412	496.5923	0.18692
6	2437	506.9907	0.19083
11	2462	470.9773	0.17728

IEEE 802.11n (ANT A (40MHz) / ANT B (40MHz))			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
3	2422	477.5292	0.23057
6	2437	502.3425	0.24255
9	2452	477.5292	0.23057

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^2.