RF Exposure Evaluation declaration

Product Name ： Dual-band Wireless-N Ethernet Adapter
Model No. ： EA-N66
FCC ID. ： MSQ-RTN66U

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

Date of Receipt : 2011/11/23
Date of Declaration : 2011/12/09
Report No. : 11B489R-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	Dual-band Wireless-N Ethernet Adapter
Test Mode	Mode 1: Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2dBi or 1.58 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11b			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (W)	Power Density at R = 20 cm (W/m^2)
1	2412	0.4169	1.310
6	2437	0.4365	1.372
11	2462	0.3715	1.168

IEEE 802.11g			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (W)	Power Density at R = 20 cm (W/m^2)
1	2412	0.5012	1.575
6	2437	0.7079	2.225
11	2462	0.8511	2.675

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 10 W/m^2.

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Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2dBi or 1.58 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 (W)	Power Density at R = 20 cm (W/m^2)
1	2412	0.7656	2.407
6	2437	0.7603	2.390
11	2462	0.7551	2.374

IEEE 802.11n (40MHz)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (W)	Power Density at R = 20 cm (W/m^2)
3	2422	0.6397	2.011
6	2437	0.7362	2.314
9	2452	0.8035	2.526

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 10 W/m^2.

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Test Mode	Mode 1: Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 4dBi or 2.51 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11a			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (W)	Power Density at R = 20 cm (W/m^2)
36	5180	0.0374	0.187
40	5220	0.0475	0.237
44	5240	0.0445	0.222

IEEE 802.11a			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (W)	Power Density at R = 20 cm (W/m^2)
149	5745	0.6026	3.009
153	5785	0.6266	3.129
165	5825	0.6823	3.407

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 10 W/m^2.

Product	Dual-band Wireless-N Ethernet Adapter
Test Mode	Mode 1: Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 4dBi or 2.51 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11 n(20MHz)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (W)	Power Density at R = 20 cm (W/m^2)
36	5180	0.0478	0.239
40	5220	0.0491	0.245
44	5240	0.0478	0.239

IEEE 802.11 n(20MHz)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (W)	Power Density at R = 20 cm (W/m^2)
149	5745	0.7998	3.994
153	5785	0.7907	3.948
165	5825	0.7780	3.885

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 10 W/m^2.

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Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 4dBi or 2.51 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11 n(40MHz)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (W)	Power Density at R = 20 cm (W/m^2)
38	5190	0.0455	0.227
46	5230	0.0424	0.212

IEEE 802.11 n(40MHz)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (W)	Power Density at R = 20 cm (W/m^2)
151	5755	0.8147	4.068
159	5795	0.7638	3.814

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 10 W/m^2.