

# RF Exposure Evaluation declaration

Product Name : ROS Home Center

Model No. : ROS-2000

FCC ID : BJM-ROS2000

Applicant : TATUNG CO.

Address : 22, Chungshan N. Rd., 3rd Sec. Taipei, Taiwan, 104, R.O.C.

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Report No. : 088191R-RFUSP05V01

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

Where

$P_d$  = power density in  $\text{mW/cm}^2$

$P_{out}$  = 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  $\text{mW/cm}^2$ . 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°C and 78% RH.

### 1.3. Test Result of RF Exposure Evaluation

Product : ROS Home Center  
Test Item : RF Exposure Evaluation  
Test Site : CTR1

#### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.15dBi(5GHz band) in logarithm scale.

#### 802.11a (5260~5320MHz)

##### Output Power Into Antenna & RF Exposure Evaluation Distance (1.15dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
1	5260.00	40.3645	0.010465
3	5300.00	42.0727	0.010908
4	5320.00	42.5598	0.011034

The distance r (4<sup>th</sup> column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.

#### 802.11a (5500~5700MHz)

##### Output Power Into Antenna & RF Exposure Evaluation Distance (1.15dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
05	5500.00	42.8549	0.011110
10	5600.00	40.4576	0.010489
15	5700.00	43.5512	0.011291

The distance r (4<sup>th</sup> column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.

**802.11n – 20BW (5260~5320MHz) -Antenna A**
**Output Power Into Antenna & RF Exposure Evaluation Distance (1.15dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
1	5260.00	20.5116	0.005318
3	5300.00	20.0909	0.005209
5	5320.00	20.6063	0.005342

The distance r (4<sup>th</sup> column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.

**802.11n – 20BW (5500~5700MHz) -Antenna A**
**Output Power Into Antenna & RF Exposure Evaluation Distance (1.15dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
05	5500.00	20.7014	0.005367
10	5600.00	20.1372	0.005221
15	5700.00	20.3236	0.005269

The distance r (4<sup>th</sup> column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.

**802.11n – 20BW (5260~5320MHz) -Antenna B**
**Output Power Into Antenna & RF Exposure Evaluation Distance (1.15dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
01	5260.00	20.6063	0.005342
03	5300.00	20.3704	0.005281
04	5320.00	20.7014	0.005367

The distance r (4<sup>th</sup> column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.

**802.11n – 20BW (5500~5700MHz) -Antenna B**
**Output Power Into Antenna & RF Exposure Evaluation Distance (1.15dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
05	5500.00	20.7970	0.005392
10	5600.00	20.2768	0.005257
15	5700.00	20.4644	0.005306

The distance r (4<sup>th</sup> column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.

**802.11n – 20BW (5260~5320MHz) -Antenna A+B**
**Output Power Into Antenna & RF Exposure Evaluation Distance (1.15dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
01	5260.00	41.1150	0.010659
03	5300.00	40.4576	0.010489
04	5320.00	41.3048	0.010709

The distance r (4<sup>th</sup> column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.

**802.11n – 20BW (5500~5700MHz) -Antenna A+B**
**Output Power Into Antenna & RF Exposure Evaluation Distance (1.15dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
05	5500.00	41.4954	0.010758
10	5600.00	40.4576	0.010489
15	5700.00	40.8319	0.010586

The distance r (4<sup>th</sup> column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.

**802.11n – 40BW (5270~5310MHz) -Antenna A**
**Output Power Into Antenna & RF Exposure Evaluation Distance (1.15dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
01	5270.00	20.6063	0.005342
02	5310.00	20.7014	0.005367

The distance r (4<sup>th</sup> column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.

**802.11n – 40BW (5510~5670MHz) - Antenna A**
**Output Power Into Antenna & RF Exposure Evaluation Distance (1.15dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
03	5510.00	20.4644	0.005306
05	5590.00	20.1837	0.005233
07	5670.00	20.5589	0.005330

The distance r (4<sup>th</sup> column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.

**802.11n – 40BW (5270~5310MHz) - Antenna B**
**Output Power Into Antenna & RF Exposure Evaluation Distance (1.15dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
01	5270.00	20.7491	0.005379
02	5310.00	20.9411	0.005429

The distance r (4<sup>th</sup> column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.

**802.11n – 40BW (5510~5670MHz) - Antenna B**
**Output Power Into Antenna & RF Exposure Evaluation Distance (1.15dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
03	5510.00	20.6063	0.005342
05	5590.00	20.3704	0.005281
07	5670.00	20.8449	0.005404

The distance r (4<sup>th</sup> column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.

**802.11n – 40BW (5270~5310MHz) - Antenna A+B**
**Output Power Into Antenna & RF Exposure Evaluation Distance (1.15dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
01	5270.00	41.4000	0.010733
02	5310.00	41.6869	0.010808

The distance r (4<sup>th</sup> column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.

**802.11n – 40BW (5510~5670MHz) - Antenna A+B**
**Output Power Into Antenna & RF Exposure Evaluation Distance (1.15dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
03	5510.00	41.1150	0.010659
05	5590.00	40.5509	0.010513
07	5670.00	41.4000	0.010733

The distance r (4<sup>th</sup> column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.