

# RF Exposure Evaluation declaration

Product Name : Plug-In PC.

Model No. : PN1HXXXXXXXX(X=0~9,A~Z or Blank)

FCC ID : FKGPN1H

Applicant : Twinhead International Corp

Address : 10F,550 Rueiguand Rd Neihu,Taipei,Taiwan 114,ROC

Date of Receipt : Jul. 05, 2011

Date of Declaration : Aug. 29, 2011

Report No. : 117148R-RFUSP42V01

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

Where

Pd = power density in mW/cm<sup>2</sup>

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/cm<sup>2</sup>. 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 : Plug-In PC.  
 Test Item : RF Exposure Evaluation  
 Test Site : No.3 OATS

#### 802.11b (1Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (2dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
1	2412.00	34.8337	0.010983
6	2437.00	31.2608	0.009857
11	2462.00	32.8095	0.010345

The RF exposure at 20 cm is below limit.

#### 802.11g (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (2dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
1	2412.00	103.9920	0.032789
6	2437.00	139.6368	0.044028
11	2462.00	103.2761	0.032563

The RF exposure at 20 cm is below limit.

#### 802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (2dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
149	5745.00	132.4342	0.041757
157	5785.00	130.6171	0.041184
165	5825.00	129.1219	0.040713

The RF exposure at 20 cm is below limit.

**802.11n-20MHz\_14.4Mbps - 2.4G Band**
**Output Power Into Antenna & RF Exposure Evaluation Distance (2dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
01	2412.00	135.2073	0.042631
06	2437.00	174.5822	0.055047
11	2462.00	157.3983	0.049628

The RF exposure at 20 cm is below limit.

**802.11n-40MHz\_30Mbps - 2.4G Band**
**Output Power Into Antenna & RF Exposure Evaluation Distance (2dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
03	2422.00	131.5225	0.041470
06	2437.00	152.0548	0.047944
09	2452.00	155.2387	0.048947

The RF exposure at 20 cm is below limit.

**802.11n-20MHz\_14.4Mbps - 5G Band**
**Output Power Into Antenna & RF Exposure Evaluation Distance (2dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
149	5745.00	196.3360	0.061906
157	5785.00	197.6970	0.062335
165	5825.00	208.4491	0.065725

The RF exposure at 20 cm is below limit.

**802.11n-40MHz\_30Mbps - 5G Band**
**Output Power Into Antenna & RF Exposure Evaluation Distance (2dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
151	5755.00	187.4995	0.059119
159	5795.00	184.9269	0.058308

The RF exposure at 20 cm is below limit.

**802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (2dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
36	5180.00	13.7088	0.004322
44	5220.00	14.7571	0.004653
48	5240.00	13.8676	0.004373

The RF exposure at 20 cm is below limit.

**802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (2dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
52	5260.00	15.6675	0.004940
60	5300.00	15.6315	0.004929
64	5320.00	16.5196	0.005209

The RF exposure at 20 cm is below limit.

**802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (2dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
100	5500.00	25.1189	0.007920
120	5600.00	25.5859	0.008067
140	5700.00	27.0396	0.008526

The RF exposure at 20 cm is below limit.

**802.11n-20MHz\_14.4Mbps**
**Output Power Into Antenna & RF Exposure Evaluation Distance (2dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
36	5180.00	19.8153	0.006248
44	5220.00	17.0216	0.005367
48	5240.00	15.7036	0.004951

The RF exposure at 20 cm is below limit.

**802.11n-20MHz\_14.4Mbps**
**Output Power Into Antenna & RF Exposure Evaluation Distance (2dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
52	5260.00	19.9526	0.006291
60	5300.00	19.3642	0.006106
64	5320.00	19.3197	0.006092

The RF exposure at 20 cm is below limit.

**802.11n-20MHz\_14.4Mbps**
**Output Power Into Antenna & RF Exposure Evaluation Distance (2dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
100	5500.00	29.6483	0.009348
120	5600.00	24.6037	0.007758
140	5700.00	24.0991	0.007599

The RF exposure at 20 cm is below limit.

**802.11n-40MHz\_30Mbps**
**Output Power Into Antenna & RF Exposure Evaluation Distance (2dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
38	5190.00	11.5080	0.003629
46	5230.00	15.2055	0.004794

The RF exposure at 20 cm is below limit.

**802.11n-40MHz\_30Mbps**
**Output Power Into Antenna & RF Exposure Evaluation Distance (2dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
54	5270.00	15.7761	0.004974
62	5310.00	12.2744	0.003870

The RF exposure at 20 cm is below limit.

**802.11n-40MHz\_30Mbps****Output Power Into Antenna & RF Exposure Evaluation Distance (2dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
102	5510.00	25.5859	0.008067
118	5590.00	21.0863	0.006649
134	5670.00	21.2324	0.006695

The RF exposure at 20 cm is below limit.