

RF Exposure Evaluation declaration

Product Name : Outdoor AP
Model No. : AP-500
FCC ID. : TWSAP-500

Applicant : Handlink Technologies Inc

Address : 4F, No. 3, Prosperity Rd. 1, Scienced-Based Industrial
Park, Hsinchu 300, Taiwan, R.O.C.

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The declaration results relate only to the samples calculated.

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Laboratory Information

We, **Quietek Corporation**, are an independent RF consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted (audited or listed) by the following related bodies in compliance with ISO 17025 specified testing scopes:

Taiwan R.O.C.	:	TAF, Accreditation Number: 1313 NCC, Certificate No : NCC-RCB-07
USA	:	FCC, Registration Number: 365520
Canada	:	IC, Submission No: 150981

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site:<http://www.quietek.com/tw/ctg/cts/accreditations.htm>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site :
<http://www.quietek.com/>

If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

HsinChu Testing Laboratory:

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LinKou Testing Laboratory:

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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	Outdoor AP
Test Mode	Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3dBi or 2.00 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 = 50 cm (mW/cm ²)
1	2412	339.63	0.0216
6	2437	359.75	0.0229
11	2462	133.35	0.0085

IEEE 802.11g			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 50 cm (mW/cm ²)
1	2412	155.24	0.0099
6	2437	173.38	0.0110
11	2462	37.84	0.0024

The power density Pd (4th column) at a distance of 50 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².

Product	Outdoor AP
Test Mode	Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3dBi or 2.00 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11n (20MHz) ANT 0+1			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 50 cm (mW/cm ²)
1	2412	76.21	0.0049
6	2437	111.94	0.0071
11	2462	103.75	0.0066

IEEE 802.11n (40MHz) ANT 0+1			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 50 cm (mW/cm ²)
3	2422	49.66	0.0032
6	2437	53.21	0.0034
9	2452	29.72	0.0019

The power density Pd (4th column) at a distance of 50 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².

Product	Outdoor AP
Test Mode	Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 16dBi or 39.81 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11a			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 50 cm (mW/cm ²)
149	5745	544.50	0.6900
157	5785	543.25	0.6884
165	5825	530.88	0.6727

The power density Pd (4th column) at a distance of 50 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².

Product	Outdoor AP
Test Mode	Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 16dBi or 39.81 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11 n(20MHz) ANT 0+1			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 50 cm (mW/cm ²)
149	5745	594.29	0.7531
157	5785	511.68	0.6484
165	5825	588.84	0.7462

IEEE 802.11 n(40MHz) ANT 0+1			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 50 cm (mW/cm ²)
151	5755	549.54	0.6964
159	5795	535.80	0.6790

The power density Pd (4th column) at a distance of 50 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².