

# Radio Frequency Exposure Report

On Behalf of

## SAPPHIRE TECHNOLOGY LIMITED

**FCC ID:** QPK-EDGEHD4

**Product Description:** Mini PC

**Model No.:** EDGE HD4

**Supplementary Model:** N/A

**Prepared for:** SAPPHIRE TECHNOLOGY LIMITED

Unit 1909 – 1919, 19/F., Tower 2, Grand Central Plaza, 138 Shatin  
Rural Committee Road, Shatin, N.T., Hong Kong

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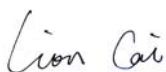
Fax: 86-755-86337028

**Report No.:** BCT12IR-1746E-2

**Issue Date:** January 14, 2013

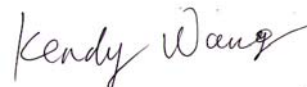
**Test Date:** January 10~14, 2013

**Tested by:**



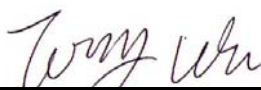
Lion Cai

**Reviewed by:**



Kendy Wang

**Approved by:**



Tony Wu

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## 1. GENERAL INFORMATION

### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Applicant:	<b>SAPPHIRE TECHNOLOGY LIMITED</b>
Address of Applicant:	Unit 1909 - 1919, 19/F., Tower 2, Grand Central Plaza, 138 Shatin Rural Committee Road, Shatin, N.T., Hong Kong
Manufacturer:	<b>SAPPHIRE TECHNOLOGY LIMITED</b>
Address of Manufacturer:	Unit 1909 - 1919, 19/F., Tower 2, Grand Central Plaza, 138 Shatin Rural Committee Road, Shatin, N.T., Hong Kong

#### General Description of E.U.T

Items	Description
EUT Description:	<b>Mini PC</b>
Trade Name:	N/A
Model No.:	<b>EDGE HD4</b>
Supplementary Model:	N/A
Frequency Band:	IEEE 802.11b/g, IEEE 802.11n HT20 (ISM Band) : 2412MHz~2462MHz, IEEE 802.11n HT40 (ISM Band) : 2422MHz~2452MHz
Channel Spacing:	IEEE 802.11b/g, 802.11n HT20/HT40: 5MHz
Number of Channels:	IEEE 802.11b/g, 802.11n HT20:11 Channels IEEE 802.11n HT40 :7 Channels
Transmit Data Rate:	maximum of 300Mbps
Type of Modulation:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20/40: OFDM (64QAM, 16QAM, QPSK, BPSK)
Antenna Type:	Built-in Antenna
Antenna Gain:	1dB
Power Supply:	Input: 19V DC 3.42A
Adapter Information:	Model: MN-A065-H190 Input:100-240V 1.5A max 50/60Hz Output: 19V DC 3.42A

\* The test data gathered are from the production sample provided by the manufacturer.

## 1.2 Objective

The objective of the following report is used to demonstrate that EUT operated in a manner that ensures the public is not exposed to radio frequency energy levels in excess of the relative provisions of FCC 47CFR Part 1.1307

## 1.3 General Description of Test

Items	Description
EUT Frequency band	<input type="checkbox"/> FHSS: 2.400GHz ~ 2.483GHz <input checked="" type="checkbox"/> WLAN: 2.400GHz ~ 2.483GHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz <input type="checkbox"/> Others: _____
Device category	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others _____
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm <sup>2</sup> ) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm <sup>2</sup> ) <input type="checkbox"/> Others: _____
Antenna diversity	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas: <div style="margin-left: 150px;"><input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity</div>
Max. output power	15.49dBm (0.0354W)
Antenna gain (Max)	1 dBi (Numeric gain:10)
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation
<b>Note:</b> 1. The maximum output power is 15.49dBm (0.0354W) at 2437MHz B MODE (with 10 numeric antenna gain.) 2. For mobile or fixed location transmitters, no SAR consideration applied. The minimum separation generally be used is at least 20 cm, even if the calculations indicate that the MPE distance would be lesser.	

## 1.4 Human Exposure Assessment Results

### Calculation

$$\text{Given } E = \frac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \frac{E^2}{3770}$$

Where  $E$  = Field Strength in Volts / meter

$P$  = Power in Watts

$G$  = Numeric antenna gain

$d$  = Distance in meters

$S$  = Power Density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = 100 * d \text{ (m)}$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \text{Equation 1}$$

Where  $d$  = distance in cm

$P$  = Power in mW

$G$  = Numeric antenna gain

$S$  = Power Density in mW / cm<sup>2</sup>

<b>EUT parameter (data from the separate report)</b>	
Given $E = \frac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \frac{E^2}{3770}$	Where G: numerical gain of transmitting antenna; TP: Transmitted power in watt; d: distance from the transmitting antenna in meter
Max average output power in Watt (TP)	15.49dBm (0.0354W)
Antenna gain (G)	1dBi (Numeric gain: 10)
Minimum distance in meter (d) (from transmitting structure to the human body)	20cm (0.2m)
Yields E =16.29V/m S=0.0704mW/cm <sup>2</sup>	
Conclusion: S=0.0704mW/cm <sup>2</sup> is significant lower than the 1mW/cm <sup>2</sup> (For mobile or fixed location transmitters, the maximum power density is 1.0 mW / cm <sup>2</sup> even if the calculation indicates that the power density would be larger.)	