FCC TEST REPORT

REPORT NO.: RF911220R07

MODEL NO.: WLL220

ACCORDING: FCC Guidelines for Human Exposure
IEEE C95.1

APPLICANT: ASKEY COMPUTER CORP.

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RF Exposure Measurement (Mobile Device)

1. Introduction

In this document, we try to prove the safety of radiation harmfulness to the human body for our product. The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. The Gain of the antenna used in this product is measured in a Fully Anechoic Chamber (FAC) calibrated for antenna measurement in ADT, and also the maximum total power input to the antenna is measured. Through the Friis transmission formula and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis transmission formula is a far field assumption, the calculated result of that is an over-prediction for near field power density. We will take that as the worst case to specify the safety range.

2. Classification

The antenna of the product, under normal use condition, is at least 20 cm away from the body of the user. Warning statement for keeping 20cm separation distance and the prohibition of operating next to a person has been printed on the users manual. So, this product is classified as the **Mobile Device**.

3. RF Exposure Limit

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental 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 Exposure				
300-1500	…	…	F/1500	6
1500-100,000	…	…	1.0	30

F = Frequency in MHz

4. 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 is 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.

Ref. : David K. Cheng, *Field and Wave Electromagnetics*, Second Edition, Page 640, Eq. (11-133).

5. EUT Operating condition

The software provided by Manufacturer enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

6. Climate Condition

The temperature and related humidity: 20 deg. C and 63 % RH

7. Test Results

7.1 Antenna Gain

The maximum Gain measured in Fully Anechoic Chamber are –0.44dBi or 0.9036(numeric) for 5GHz and 0.39dBi or 1.094(numeric) for 2.4GHz.

7.2 Output Power Into Antenna & RF Exposure Distance :

For Part 802.11b:

CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER TO ANTENNA (mW)	MINIMUM ALLOWABLE DISTANCE (r) FROM SKIN (Centi-Meter)
1	2412	41.114	1.892
6	2437	45.708	1.994
11	2462	42.402	1.922

For Part 802.11a:
Normal Mode:

CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER TO ANTENNA (mW)	MINIMUM ALLOWABLE DISTANCE (r) FROM SKIN (Centi-Meter)
1	5180	42.169	1.741
4	5240	40.832	1.713
5	5260	43.251	1.763
8	5320	44.565	1.790
9	5745	44.977	1.801
12	5805	51.880	1.934

Turbo Mode:

CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER TO ANTENNA (mW)	MINIMUM ALLOWABLE DISTANCE (r) FROM SKIN (Centi-Meter)
1	5210	47.643	1.851
2	5250	46.131	1.821
3	5290	44.668	1.792
4	5760	45.919	1.817
5	5800	26.668	1.384

The minimum allowable distance is very close to the enclosure of the antenna and is very far away from the human being under normal use condition.