FCC TEST REPORT

REPORT NO.: RF911128H07

MODEL NO.: A13QBF

ACCORDING: FCC Guidelines for Human Exposure
IEEE C95.1

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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. Test Results

6.1 Antenna Gain

The maximum Gain measured in Fully Anechoic Chamber is 6dBi or 3.98(numeric).

6.2 Output Power Into Antenna & RF Exposure Distance :

Normal Mode:

CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER TO ANTENNA (mW)	MINIMUM ALLOWABLE DISTANCE (r) FROM SKIN (Centi-Meter)
1	5180	28.71	3.02
4	5240	48.98	3.94
5	5260	54.58	4.16
8	5320	30.62	3.11
9	5745	78.70	4.99
11	5805	122.18	6.22
13	5825	110.15	5.91

Turbo Mode:

CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER TO ANTENNA (mW)	MINIMUM ALLOWABLE DISTANCE (r) FROM SKIN (Centi-Meter)
1	5210	30.97	3.13
2	5250	30.97	3.13
3	5290	31.33	3.15
4	5760	42.85	3.68
5	5800	47.64	3.89

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.