

RF EXPOSURE REPORT

 REPORT NO.:
 SA940917L01A

 MODEL NO.:
 DI-725EV

 OEM MODEL NO.:
 TXRTR10004

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. 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)

Frequency	Electric Field	Magnetic Field	Power Density	Average Time
Range	Strength (V/m)	Strength (A/m)	(mW/cm ²)	(minutes)
(MHz)				
(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

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

F = Frequency in MHz

FCC ID: KA2DI725EVA1



3. Friis Formula

Friis transmission formula : Pd = (Pout*G) / $(4*pi*r^2)$

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

If we know the maximum Gain of the antenna and the total power input to the antenna, through the calculation, we will know the MPE value at distance r.

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

4. EUT Operating condition

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

5. Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. Warning statement to the user for keeping at least 20cm or more separation distance with the antenna should be included in users manual. So, this device is classified as **Mobile Device**.



6. Test Results

6.1 Antenna Gain

FOR WLAN FUNCTION:

The maximum Gain measured in Fully Anechoic Chamber is 2.39dBi or 1.734 (numeric).

FOR CDMA FUNCTION:

CDMA 800: Since the maximum erp power is used, so the Gain of the antenna can be assumed as 2.14dBi.

CDMA 1900: Since the maximum eirp power is used, so the Gain of the antenna can be assumed as 0dBi.

NOTE: The power as above refers to the FCC part 22 / 24 report of FCC ID: OVFKWC-KPC650.

6.2 Output Power Into Antenna & RF Exposure value at distance 20cm:

WLAN 802.11b:

CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER TO ANTENNA (mW)	POWER DENSITY (mW/cm²)	LIMIT OF POWER DENSITY (mW/cm²)
1	2412	45.920	0.016	1.0
6	2437	45.920	0.016	1.0
11	2462	46.238	0.016	1.0

WLAN 802.11g:

CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER TO ANTENNA (mW)	POWER DENSITY (mW/cm²)	LIMIT OF POWER DENSITY (mW/cm²)
1	2412	36.058	0.012	1.0
6	2437	36.224	0.012	1.0
11	2462	35.727	0.012	1.0



CDMA 800:

CHANNEL	CHANNEL FREQUENCY (MHz)	E.I.R.P (mW)	POWER DENSITY (mW/cm²)	LIMIT OF POWER DENSITY (mW/cm²)
1013	824.70	325.837	0.065	0.549
384	836.52	325.087	0.065	0.549
777	848.31	488.652	0.097	0.549

NOTE: Limit of powre density = 824 (MHz) / 1500 = 0.549.

CDMA 1900:

CHANNEL	CHANNEL FREQUENCY (MHz)	E.I.R.P (mW)	POWER DENSITY (mW/cm²)	LIMIT OF POWER DENSITY (mW/cm ²)
25	1851.25	221.820	0.044	1.0
600	1880.00	229.615	0.046	1.0
1175	1908.75	256.448	0.051	1.0

CONCULSION:

Both of the WLAN and CDMA can transmit simultaneously, the formula of calculated the MPE is:

CPD₁ / LPD₁ + CPD₂ / LPD₂ +etc. < 1

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is 0.097 / 0.549 + 0.016 / 1 = 0.1927, which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.