

## RF Exposure evaluation

**Product Name: Electric Toilet**  
**Model Number: 20000002002300**  
**FCCID: 2ACSF20000002002300**

### 1.1 RF Exposure Limit

According to FCC 1.1310 table 1: 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 <sup>2</sup> )	Average Time (minutes)
<b>(A)Limits For Occupational / Control Exposures</b>				
300-1500	...	...	F/300	6
1500-100,000	...	...	5	6
<b>(B)Limits For General Population / Uncontrolled Exposure</b>				
300-1500	...	...	f /1500	6
1500-100,000	...	...	1.0	30

*f* = Frequency in MHz

### 1.2 EUT Operating condition

The EUT transmits at a single frequency and at the highest output power.

### 1.3 Antenna Gain

The maximum Gain measured in Semi-Anechoic Chamber is 8.0 dBi or 6.310 (numeric).

### 1.4 Output Power into Antenna & RF Exposure value at distance 20cm:

Calculations for this report are based on highest power measurement and the highest gain of the antenna. Limit for MPE (from FCC part 1.1310 table 1) is 1.0 mW/cm<sup>2</sup>

$$\text{eirp} = \text{pt} \times \text{gt} = (\text{E} \times \text{d})^2/30$$

Where:

Pt = transmitter output power in watts,

gt = numeric gain of the transmitting antenna (unitless),

E = electric field strength in V/m, ---  $10^{(\text{dBuV/m})/20}/10^6$

d = measurement distance in meters (m) --- 3m

$$\text{So } Pt = (E \times d)^2 / 30 \times gt$$

Maximum Field strength: 20000002002300: 110.340 dBuV/m @3m --10525MHz

Refer to 708881474503-00 FCC Part 15C 15.245 Test Report page 13.

Ant gain = 8dBi; so Ant numeric gain=6.310

So, for 20000002002300,  $Pt = \{[(10^{(110.340/20)/10^6}) \times 3]^2 / 30 \times 1\} \times 1000\text{mW} = 32.443\text{ mW}$

Highest Pout is 32.443 mW, highest antenna gain (in linear scale) is 6.310 R is 20cm, and f = 10525 MHz

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Note: This calculation is assuming 100% duty cycle, which would not be the case in normal operation.

Uncontrolled Exposures - Limit (mW/cm <sup>2</sup> ) =	1	
Pd =	0.040727	mW/cm <sup>2</sup>
Uncontrolled Margin to Limit=	0.959273	mW/cm <sup>2</sup>

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

## 1.5 Sample Calculation

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

Where;

Pd = power density in mW/cm<sup>2</sup>

Pout = output power to antenna in mW

G = gain of antenna in linear scale

$\pi \approx 3.1416$

R = distance between observation point and center of the radiator in cm