



# H.B. Compliance Solutions

## RF Exposure MPE Report

For the

**The Hillman Group**

**Instafob**

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A handwritten signature in black ink, appearing to read 'Hoosamuddin'.

Hoosamuddin Bandukwala



Cert # ATL-0062-E

## 1. Equipment Overview

|                                        |                                                                                |
|----------------------------------------|--------------------------------------------------------------------------------|
| <b>Product Name:</b>                   | KeyKrafter                                                                     |
| <b>Model(s) Tested:</b>                | Y0001450                                                                       |
| <b>FCC ID:</b>                         | 2AYY8INSTFBKK                                                                  |
| <b>Supply Voltage Input:</b>           | Primary Power: 120VAC                                                          |
| <b>Frequency Range:</b>                | 0.125 MHz                                                                      |
| <b>No. of Channels:</b>                | 1                                                                              |
| <b>Type(s) of Modulation:</b>          | Sinewave                                                                       |
| <b>Range of Operation Power:</b>       | 972x10 <sup>-9</sup> Watts (Radiated)                                          |
| <b>Emission Designator:</b>            | N/A                                                                            |
| <b>Channel Spacing(s)</b>              | None                                                                           |
| <b>Test Item:</b>                      | Pre-Production                                                                 |
| <b>Type of Equipment:</b>              | Fixed                                                                          |
| <b>Antenna Requirement (§15.203) :</b> | Type of Antenna: Integral Loop<br>Gain of Antenna: 0dBi                        |
| <b>Environmental Test Conditions:</b>  | Temperature: 15-35°C<br>Humidity: 30-60%<br>Barometric Pressure: 860-1060 mbar |
| <b>Modification to the EUT:</b>        | None                                                                           |

## 2. Applicable Standard

According to §1.1307 the criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter. Test Limits

Evaluated against exposure limits: General Use  X  or Controlled Use

### Maximum Permissible Exposure (MPE)

| Frequency range<br>(MHz)                                       | Electric field<br>strength<br>(V/m) | Magnetic field<br>strength<br>(A/m) | Power density<br>(mW/cm <sup>2</sup> ) | Averaging time<br>(minutes) |
|----------------------------------------------------------------|-------------------------------------|-------------------------------------|----------------------------------------|-----------------------------|
| <b>(A) Limits for Occupational/Controlled Exposure</b>         |                                     |                                     |                                        |                             |
| 0.3–3.0 .....                                                  | 614                                 | 1.63                                | * 100                                  | 6                           |
| 3.0–30 .....                                                   | 1842/f                              | 4.89/f                              | * 900/f <sup>2</sup>                   | 6                           |
| 30–300 .....                                                   | 61.4                                | 0.163                               | 1.0                                    | 6                           |
| 300–1,500 .....                                                | .....                               | .....                               | f/300                                  | 6                           |
| 1,500–100,000 .....                                            | .....                               | .....                               | 5                                      | 6                           |
| <b>(B) Limits for General Population/Uncontrolled Exposure</b> |                                     |                                     |                                        |                             |
| 0.3–1.34 .....                                                 | 614                                 | 1.63                                | * 100                                  | 30                          |
| 1.34–30 .....                                                  | 824/f                               | 2.19/f                              | * 180/f <sup>2</sup>                   | 30                          |
| 30–300 .....                                                   | 27.5                                | 0.073                               | 0.2                                    | 30                          |
| 300–1,500 .....                                                | .....                               | .....                               | f/1500                                 | 30                          |
| 1,500–100,000 .....                                            | .....                               | .....                               | 1.0                                    | 30                          |

f = frequency in MHz\* = Plane-wave equivalent power density

RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules.

The emissions should be within the limits at 300kHz in the above table. (Use 300kHz limits for 150kHz)

### 3. Test Results

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where,

S = power density (mW/cm<sup>2</sup>)

P = output power at the antenna terminal (mW)

G = gain of transmit antenna (numeric)

R = distance from transmitting antenna (cm)

Maximum peak output power at antenna input terminal = -26.42 (dBm)

Maximum peak output power at antenna input terminal = 2280 (nW)

Antenna gain (typical) = 0 (dBi)

Maximum antenna gain = 1.0 (numeric)

Prediction distance = 20 (cm)

Prediction frequency = 0.125 (MHz)

MPE limit for uncontrolled exposure at prediction frequency = 100 (mW/cm<sup>2</sup>)

*Power density at prediction frequency = 0 (mW/cm<sup>2</sup>)*

To solve for the minimum mounting distance required;

$$R = \sqrt{PG/4\pi S}$$

$$R = \sqrt{2280 \times 10^{-9} \times 1.0 / 4\pi \times 0} = \underline{20 \text{ cm}} \text{ (Based on continuous transmission)}$$

## Simultaneous Transmission Evaluation

### Limit

The sum of the ratios of the peak or spatially averaged results to the applicable frequency dependent MPE limits must be <1 at all locations where users and bystanders can be exposed.

### Calculation

| Mode           | Cellular Modem<br>Power<br>Density/Limit | 125kHz RFID<br>Power Density/Limit | $\Sigma$ (Power Density/Limit)<br>of Cellular+125kHz RFID |
|----------------|------------------------------------------|------------------------------------|-----------------------------------------------------------|
| Cellular Modem | 0.550                                    |                                    |                                                           |
| 125kHz RFID    |                                          | 0.0                                | 0.550                                                     |

The Cellular and 125kHz RFID transmitter, the aggregated (power density/limit) is smaller than 1, and the MPE of 2 collocated transmitters is compliant.

**Note: FCC ID for the pre-certified Cellular Modem XMR201808EC25AF.**

## END OF TEST REPORT