

## MPE Evaluation

Approved By:



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### Summary and Operating Condition:

|                               |                                                                                                                                                                                                                   |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EUT</b>                    | ECRI                                                                                                                                                                                                              |
| <b>IC</b>                     | 30310-ECRIA01                                                                                                                                                                                                     |
| <b>FCC ID</b>                 | 2BARY-ECRIA01                                                                                                                                                                                                     |
| <b>EUT Received</b>           | 3 March 2023                                                                                                                                                                                                      |
| <b>EUT Tested</b>             | 3 March 2023- 17 April 2023                                                                                                                                                                                       |
| <b>Operating Band</b>         | 2400 – 2483.5 MHz                                                                                                                                                                                                 |
| <b>Device Type</b>            | <input checked="" type="checkbox"/> GMSK <input type="checkbox"/> GFSK <input type="checkbox"/> BT BR <input type="checkbox"/> BT EDR 2MB <input type="checkbox"/> BT EDR 3MB<br><input type="checkbox"/> 802.11x |
| <b>Power Supply / Voltage</b> | 12VDC                                                                                                                                                                                                             |

NOTE: For more detailed features description, please refer to the manufacturer's specifications or user's manual.

## FCC

Maximum exposure limits from CFR 47, FCC Part 1.1310:

Table 1—Limits for Maximum Permissible Exposure (MPE)

| Frequency range<br>(MHz)                                       | Electric field strength<br>(V/m) | Magnetic field 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                          |

**Table 1 - Power Density Calculations, FCC**

|                                 |                |              |                                     |                                    |               |                             |            |        |
|---------------------------------|----------------|--------------|-------------------------------------|------------------------------------|---------------|-----------------------------|------------|--------|
| Occupational/Controlled         |                |              | <input type="checkbox"/>            |                                    |               |                             |            |        |
| General Population/uncontrolled |                |              | <input checked="" type="checkbox"/> |                                    |               |                             |            |        |
| FCC Power Density Calculations  |                |              |                                     |                                    |               |                             |            |        |
| Frequency                       | Radiated Power | Antenna Gain | Peak Power EIRP                     | Peak Power EIRP +10% for Tolerance | Power Density | Limit at specified distance | % of limit | Result |
| MHz                             | mW             | numerical    | mW                                  | mW                                 | mW/cm^2       | mW/cm^2                     | %          |        |
| 2402.00                         | 6.19           | 1.00         | 6.19                                | 6.81                               | 0.001         | 1.00                        | 0.135      | PASS   |
| 2440.00                         | 4.60           | 1.00         | 4.60                                | 5.05                               | 0.001         | 1.00                        | 0.101      | PASS   |
| 2480.00                         | 3.59           | 1.00         | 3.59                                | 3.95                               | 0.001         | 1.00                        | 0.079      | PASS   |

|              |    |    |
|--------------|----|----|
| Distance (d) | 20 | cm |
|--------------|----|----|

**$S = (P \times G)/(4 \times \pi \times d^2)$  – used to calculate exposure at "d" cm**

**$EIRP = P \times G$ , measured as field strength**

**$d = \sqrt{(S/(P \times G) \times 4 \times \pi)}$  – used to calculate minimum distance to meet limits**

Note: The user's manual will stipulate that a 20cm minimum distance from the user is to be maintained.  
EIRP values in mW were multiplied by 1.1 to account for a 10% tolerance.  
Numerical Antenna gain set to 1.00, power was measured using radiated method.

S= power density

P = transmitter conducted power (in mW)

G = antenna numeric gain

d = distance to radiation center (20 cm)

## IC / ISED

### Using RSS-102, Issue 5, Section 2.5.2

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $4.49/f^{0.5}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{(0.6834)}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz.
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance). In these cases, the information contained in the RF exposure.

**Table 2 - Power Density Calculations, IC/ISED**

| IPH-04109 |                 |                        |                 |                     |                 |        |
|-----------|-----------------|------------------------|-----------------|---------------------|-----------------|--------|
| Frequency | Conducted Power | Antenna Gain Numerical | Peak EIRP Power | EIRP +10% Tolerance | Exemption Limit | Result |
| MHz       | mW              | Num.                   | mW              | mW                  | mW              |        |
| 2402      | 6.19            | 1.00                   | 6.19            | 6.81                | 2676.42         | PASS   |
| 2440      | 4.595           | 1.00                   | 4.60            | 5.05                | 2705.29         | PASS   |
| 2480      | 3.593           | 1.00                   | 3.59            | 3.95                | 2735.52         | PASS   |

EIRP values in mW were multiplied by 1.1 to account for a 10% tolerance.

Numerical Antenna gain set to 1.00, power was measured using radiated method.