



# CTC Laboratories, Inc.

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## Maximum Permissible Exposure Evaluation

FCC ID: 2APPZ-X7A

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) Radiation as specified in §1.1307(b)

### EUT Specification

|                            |   |
|----------------------------|---|
| Product Name:              | IP phone  |
| Trade Mark:                | Fanvil  |
| Model/Type reference:      | X7A   |
| Listed Model(s):           | N/A   |
| Frequency band (Operating) | <input checked="" type="checkbox"/> BT: 2.402GHz ~ 2.480GHz<br><input checked="" type="checkbox"/> BLE: 2.402GHz ~ 2.480GHz<br><input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz<br><input checked="" type="checkbox"/> RLAN: 5.180GHz ~ 5.240GHz<br><input checked="" type="checkbox"/> RLAN: 5.745GHz ~ 5.825GHz<br><input type="checkbox"/> Others |
| Device category            | <input type="checkbox"/> Portable (<20cm separation)<br><input type="checkbox"/> Mobile (>20cm separation)<br><input checked="" type="checkbox"/> fixed (>20cm separation)<br><input type="checkbox"/> Others _____   |
| Exposure classification    | <input type="checkbox"/> Occupational/Controlled exposure (S=5mW/cm <sup>2</sup> )<br><input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm <sup>2</sup> )   |
| Antenna diversity          | <input checked="" type="checkbox"/> Single antenna<br><input type="checkbox"/> Multiple antennas<br><input type="checkbox"/> Tx diversity<br><input type="checkbox"/> Rx diversity<br><input type="checkbox"/> Tx/Rx diversity  |
| Antenna gain (Max)         | 2.2dBi for 2.4GHz<br>2.3dBi for 5GHz WIFI   |
| Evaluation applied         | <input checked="" type="checkbox"/> MPE Evaluation<br><input type="checkbox"/> SAR Evaluation   |

### 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 |
|---|------------------------------|------------------------------|------------------------------------|--------------|
| (A) Limits for Occupational/Control Exposures         |                              |                              |                                    |              |
| 300-1500  | --                           | --                           | F/300                              | 6            |
| 1500-100000   | --                           | --                           | 5                                  | 6            |
| (B) Limits for General Population/Uncontrol Exposures |                              |                              |                                    |              |
| 300-1500  | --                           | --                           | F/1500                             | 6            |
| 1500-100000   | --                           | --                           | 1                                  | 30           |

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Friis transmission formula:  $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

$P_d$  = Power density in  $mW/cm^2$

$P_{out}$  = 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

$P_d$  the limit of MPE  $1mW/cm^2$ . If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

#### Measurement Result

| BLE  |                         |                           |                         |                          |                    |                                     |                                    |
|------|-------------------------|---------------------------|-------------------------|--------------------------|--------------------|-------------------------------------|------------------------------------|
| Type | Channel frequency (MHz) | Max. Measured Power (dBm) | Tune up tolerance (dBm) | Max. Tune up Power (dBm) | Antenna Gain (dBi) | Power density at 20cm ( $mW/cm^2$ ) | Power density Limits ( $mW/cm^2$ ) |
| GFSK | 2402                    | 5.87                      | 5±1                     | 6                        | 2.2                | 0.00131                             | 1                                  |
|      | 2440                    | 4.78                      | 4±1                     | 5                        | 2.2                | 0.00104                             | 1                                  |
|      | 2480                    | 3.89                      | 3±1                     | 4                        | 2.2                | 0.00083                             | 1                                  |

| BR/ EDR |                         |                           |                         |                          |                    |                                     |                                    |
|---------|-------------------------|---------------------------|-------------------------|--------------------------|--------------------|-------------------------------------|------------------------------------|
| Type    | Channel frequency (MHz) | Max. Measured Power (dBm) | Tune up tolerance (dBm) | Max. Tune up Power (dBm) | Antenna Gain (dBi) | Power density at 20cm ( $mW/cm^2$ ) | Power density Limits ( $mW/cm^2$ ) |
| 8-DPSK  | 2402                    | 8.25                      | 8±1                     | 9                        | 2.2                | 0.00262                             | 1                                  |
|         | 2441                    | 7.55                      | 7±1                     | 8                        | 2.2                | 0.00208                             | 1                                  |
|         | 2480                    | 6.51                      | 6±1                     | 7                        | 2.2                | 0.00165                             | 1                                  |

| 2.4G WIFI |                         |                           |                         |                          |                    |                                     |                                    |
|-----------|-------------------------|---------------------------|-------------------------|--------------------------|--------------------|-------------------------------------|------------------------------------|
| Type      | Channel frequency (MHz) | Max. Measured Power (dBm) | Tune up tolerance (dBm) | Max. Tune up Power (dBm) | Antenna Gain (dBi) | Power density at 20cm ( $mW/cm^2$ ) | Power density Limits ( $mW/cm^2$ ) |
| 802.11 b  | 2412                    | 17.19                     | 17±1                    | 18                       | 2.2                | 0.02083                             | 1                                  |
|           | 2437                    | 17.28                     | 17±1                    | 18                       | 2.2                | 0.02083                             | 1                                  |
|           | 2462                    | 17.32                     | 17±1                    | 18                       | 2.2                | 0.02083                             | 1                                  |



| 5G WIFI U-NII-1 |                         |                           |                         |                          |                    |   |  |
|-----------------|-------------------------|---------------------------|-------------------------|--------------------------|--------------------|---|--|
| Type            | Channel frequency (MHz) | Max. Measured Power (dBm) | Tune up tolerance (dBm) | Max. Tune up Power (dBm) | Antenna Gain (dBi) | Power density at 20cm (mW/cm <sup>2</sup> ) | Power density Limits (mW/cm <sup>2</sup> ) |
| 802.11a         | 5180                    | 15.83                     | 15±1                    | 16                       | 2.3                | 0.01345                                     | 1  |
|                 | 5200                    | 15.59                     | 15±1                    | 16                       | 2.3                | 0.01345                                     | 1  |
|                 | 5240                    | 15.01                     | 15±1                    | 16                       | 2.3                | 0.01345                                     | 1  |
| 802.11 n40      | 5190                    | 14.33                     | 14±1                    | 15                       | 2.3                | 0.01068                                     | 1  |
|                 | 5230                    | 14.87                     | 14±1                    | 15                       | 2.3                | 0.01068                                     | 1  |
| 802.11 ac80     | 5210                    | 10.66                     | 10±1                    | 11                       | 2.3                | 0.00425                                     | 1  |

| 5G WIFI U-NII-3 |                         |                           |                         |                          |                    |   |  |
|-----------------|-------------------------|---------------------------|-------------------------|--------------------------|--------------------|---|--|
| Type            | Channel frequency (MHz) | Max. Measured Power (dBm) | Tune up tolerance (dBm) | Max. Tune up Power (dBm) | Antenna Gain (dBi) | Power density at 20cm (mW/cm <sup>2</sup> ) | Power density Limits (mW/cm <sup>2</sup> ) |
| 802.11a         | 5745                    | 11.28                     | 11±1                    | 12                       | 2.3                | 0.00535                                     | 1  |
|                 | 5785                    | 10.22                     | 10±1                    | 11                       | 2.3                | 0.00425                                     | 1  |
|                 | 5825                    | 9.88                      | 9±1                     | 10                       | 2.3                | 0.00338                                     | 1  |
| 802.11 n40      | 5755                    | 8.98                      | 8±1                     | 9                        | 2.3                | 0.00268                                     | 1  |
|                 | 5795                    | 8.27                      | 8±1                     | 9                        | 2.3                | 0.00268                                     | 1  |
| 802.11 ac80     | 5775                    | 6.56                      | 6±1                     | 7                        | 2.3                | 0.00169                                     | 1  |

The WLAN or Bluetooth can transmit simultaneously

| WLAN Power density at 20cm (mW/cm <sup>2</sup> ) | BT Power density at 20cm (mW/cm <sup>2</sup> ) | Total Power density at 20cm (mW/cm <sup>2</sup> ) | Power density Limits (mW/cm <sup>2</sup> ) |
|--|--|---|--|
| 0.02083  | 0.00262  | 0.02345   | 1  |

#### Note

For a more detailed features description, please refer to the RF Test Report.

\*\*\*\*\*THE END\*\*\*\*\*

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