

## RF EXPOSURE EVALUATION

### EUT Specification

|                                       |                                                                                                                                                                                                                                                                                                          |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EUT</b>                            | PHIIMAX3D PANORAMIC CAMERA                                                                                                                                                                                                                                                                               |
| <b>Frequency band<br/>(Operating)</b> | <input type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz<br><input checked="" type="checkbox"/> WLAN: 5.18GHz ~ 5.24GHz<br><input type="checkbox"/> WLAN: 5.50GHz ~ 5.70GHz<br><input checked="" type="checkbox"/> WLAN: 5.745GHz ~ 5825GHz<br><input type="checkbox"/> Others(Bluetooth: 2.402GHz ~ 2.480GHz) |
| <b>Device category</b>                | <input type="checkbox"/> Portable (<20cm separation)<br><input checked="" type="checkbox"/> Mobile (>20cm separation)<br><input type="checkbox"/> Others ____                                                                                                                                            |
| <b>Antenna diversity</b>              | <input type="checkbox"/> Single antenna<br><input checked="" type="checkbox"/> Multiple antennas<br><input type="checkbox"/> Tx diversity<br><input type="checkbox"/> Rx diversity<br><input type="checkbox"/> Tx/Rx diversity                                                                           |
| <b>Max. output power</b>              | 14.92 dBm (31.05mW) for 5G WIFI Band1<br>15.52 dBm (35.65mW) for 5G WIFI Band4                                                                                                                                                                                                                           |
| <b>Antenna gain</b>                   | Ant_0: 3dBi<br>Ant_1: 3dBi<br>MIMO Gain: 6.01dBi                                                                                                                                                                                                                                                         |
| <b>Evaluation applied</b>             | <input checked="" type="checkbox"/> MPE Evaluation<br><input type="checkbox"/> SAR Evaluation                                                                                                                                                                                                            |

According to KDB 662911 D01 Multiple Transmitter Output v02r01 (F) (d):  
MIMO gain:  $3\text{dBi} + 10\log(2) = 6.01\text{dBi}$

Limits for Maximum Permissible Exposure (MPE)

| Frequency Range(MHz) | Electric Field Strength(V/m) | Magnetic Field Strength(A/m) | Power Density( $\text{mW}/\text{cm}^2$ ) |
|----------------------|------------------------------|------------------------------|------------------------------------------|
| 300-1500             | --                           | --                           | F/1500                                   |
| 1500-100000          | --                           | --                           | 1                                        |

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

Where

$P_d$  = Power density in mW/cm<sup>2</sup>

$P_{out}$  = 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<sup>2</sup>. 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

| Channel                           | Gain | Channel Frequency (MHz) | Max Output power (dBm) | Tolerance | Max Tune-UP power (mW) | Power density at 20cm (mW/ cm <sup>2</sup> ) | Power density Limits (mW/cm <sup>2</sup> ) |
|-----------------------------------|------|-------------------------|------------------------|-----------|------------------------|----------------------------------------------|--------------------------------------------|
| <b>5G WIFI Band1</b>              |      |                         |                        |           |                        |                                              |                                            |
| <b>Test Mode: 802.11a</b>         |      |                         |                        |           |                        |                                              |                                            |
| Low                               | 3    | 5180                    | 10.39                  | ±0.5      | 12.27                  | 0.0049                                       | 1                                          |
| Middle                            | 3    | 5200                    | 9.29                   | ±0.5      | 9.53                   | 0.0038                                       | 1                                          |
| High                              | 3    | 5240                    | 11.22                  | ±0.5      | 14.86                  | 0.0059                                       | 1                                          |
| <b>Test Mode: 802.11n(HT20)</b>   |      |                         |                        |           |                        |                                              |                                            |
| Low                               | 6.01 | 5180                    | 12.04                  | ±0.5      | 17.95                  | 0.0142                                       | 1                                          |
| Middle                            | 6.01 | 5200                    | 12.11                  | ±0.5      | 18.24                  | 0.1445                                       | 1                                          |
| High                              | 6.01 | 5240                    | 14.92                  | ±0.5      | 34.83                  | 0.0276                                       | 1                                          |
| <b>Test Mode: 802.11ac(VHT20)</b> |      |                         |                        |           |                        |                                              |                                            |
| Low                               | 6.01 | 5180                    | 12.01                  | ±0.5      | 17.82                  | 0.0141                                       | 1                                          |
| Middle                            | 6.01 | 5200                    | 12.06                  | ±0.5      | 18.03                  | 0.0143                                       | 1                                          |
| High                              | 6.01 | 5240                    | 14.84                  | ±0.5      | 34.20                  | 0.0271                                       | 1                                          |
| <b>Test Mode: 802.11n(HT40)</b>   |      |                         |                        |           |                        |                                              |                                            |
| Low                               | 6.01 | 5190                    | 11.89                  | ±0.5      | 17.34                  | 0.0138                                       | 1                                          |
| High                              | 6.01 | 5230                    | 13.25                  | ±0.5      | 23.71                  | 0.0188                                       | 1                                          |
| <b>Test Mode: 802.11ac(VHT40)</b> |      |                         |                        |           |                        |                                              |                                            |
| Low                               | 6.01 | 5190                    | 11.96                  | ±0.5      | 17.62                  | 0.0140                                       | 1                                          |
| High                              | 6.01 | 5230                    | 13.27                  | ±0.5      | 23.82                  | 0.0189                                       | 1                                          |
| <b>Test Mode: 802.11ac(VHT80)</b> |      |                         |                        |           |                        |                                              |                                            |
| ---                               | 6.01 | 5210                    | 12.30                  | ±0.5      | 19.05                  | 0.0151                                       | 1                                          |

| Channel                           | Gain | Channel Frequency (MHz) | Max Output power (dBm) | Tolerance | Max Tune-UP power (mW) | Power density at 20cm (mW/ cm <sup>2</sup> ) | Power density Limits (mW/cm <sup>2</sup> ) |
|-----------------------------------|------|-------------------------|------------------------|-----------|------------------------|----------------------------------------------|--------------------------------------------|
| <b>5G WIFI Band4</b>              |      |                         |                        |           |                        |                                              |                                            |
| <b>Test Mode: 802.11a</b>         |      |                         |                        |           |                        |                                              |                                            |
| Low                               | 3    | 5745                    | 13.25                  | ±0.5      | 23.71                  | 0.0094                                       | 1                                          |
| Middle                            | 3    | 5785                    | 13.95                  | ±0.5      | 27.86                  | 0.0111                                       | 1                                          |
| High                              | 3    | 5825                    | 13.31                  | ±0.5      | 24.04                  | 0.0095                                       | 1                                          |
| <b>Test Mode: 802.11n(HT20)</b>   |      |                         |                        |           |                        |                                              |                                            |
| Low                               | 6.01 | 5745                    | 14.85                  | ±0.5      | 34.28                  | 0.0272                                       | 1                                          |
| Middle                            | 6.01 | 5785                    | 15.03                  | ±0.5      | 35.73                  | 0.0284                                       | 1                                          |
| High                              | 6.01 | 5825                    | 14.80                  | ±0.5      | 33.88                  | 0.0269                                       | 1                                          |
| <b>Test Mode: 802.11ac(VHT20)</b> |      |                         |                        |           |                        |                                              |                                            |
| Low                               | 6.01 | 5745                    | 14.84                  | ±0.5      | 34.20                  | 0.0271                                       | 1                                          |
| Middle                            | 6.01 | 5785                    | 15.08                  | ±0.5      | 36.14                  | 0.0287                                       | 1                                          |
| High                              | 6.01 | 5825                    | 14.81                  | ±0.5      | 33.96                  | 0.0270                                       | 1                                          |
| <b>Test Mode: 802.11n(HT40)</b>   |      |                         |                        |           |                        |                                              |                                            |
| Low                               | 6.01 | 5755                    | 14.78                  | ±0.5      | 33.73                  | 0.0268                                       | 1                                          |
| High                              | 6.01 | 5795                    | 15.52                  | ±0.5      | 39.99                  | 0.0317                                       | 1                                          |
| <b>Test Mode: 802.11ac(VHT40)</b> |      |                         |                        |           |                        |                                              |                                            |
| Low                               | 6.01 | 5755                    | 14.75                  | ±0.5      | 33.50                  | 0.0266                                       | 1                                          |
| High                              | 6.01 | 5795                    | 15.07                  | ±0.5      | 36.06                  | 0.0286                                       | 1                                          |
| <b>Test Mode: 802.11ac(VHT80)</b> |      |                         |                        |           |                        |                                              |                                            |
| ---                               | 6.01 | 5775                    | 14.86                  | ±0.5      | 34.36                  | 0.0273                                       | 1                                          |