

## RF Exposure Considerations

### 1. Measuring Standard

KDB 680106 D01 RF Exposure Wireless Charging Apps v03

### 2. Requirements

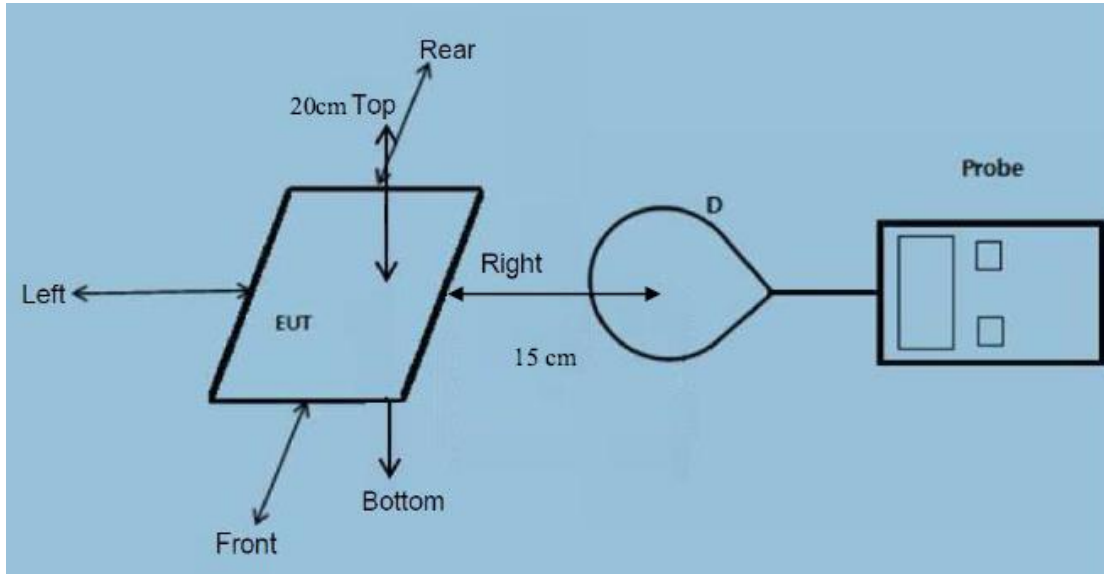
According to the item 5.2 of KDB 680106 D01v03:

For device designed for typical desktop applications, RF exposure evaluation should be conducted assuming a user separation distance of 20cm (Top) and 15cm (Edge). E and H field strength measurements or numerical modeling may be used to demonstrate compliance. Measurements should be made from all sides and the top of the primary/client pair, with the 20cm(Top) and 15cm(Edge) measured from the center of the probe(s) to the edge of the device.

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> ) | Averaging time (minutes) |
|---|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| <b>(A) Limits for Occupational/Controlled Exposures</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                        |
| 300-1500  | /                             | /                             | f/300                               | 6                        |
| 1500-100,000  | /                             | /                             | 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                       |
| 300-1500  | /                             | /                             | f/1500                              | 30                       |
| 1500-100,000  | /                             | /                             | 1.0                                 | 30                       |
| F=frequency in MHz<br>*=Plane-wave equivalent power density<br>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 Table 1 of 1.1310(use the 300kHz limits for 150kHz:614V/m,1.63A/m). |                               |                               |                                     |                          |

### 3. Test Setup



Note:

1. The RF exposure test is performed in the shield room.
2. The test distance is between the edge of the charger and geometric centre of probe.

### 4. Test Equipment List

| Test Equipment       | Manufacturer | Model No. | Calibration Due |
|----------------------|--------------|-----------|-----------------|
| Magnetic field meter | NARDA        | ELT-400   | Sep. 03, 2020   |

## 5. Test Result

The EUT does comply with item 5 KDB 680106 D01v03.

- (1) Power transfer frequency is less than 1MHz.
  - The device operate in the frequency range 110-205kHz.
- (2) Output power from each primary coil is less than or equal to 15 watts.
  - The maximum output power of the primary coil is 10W.
- (3) The transfer system includes only single primary and secondary coils. This includes charging systems that may have multiple primary coils and clients that are able to detect and allow coupling only between individual pairs of coils.
  - The transfer system includes a charging system with only single primary coils is to detect and allow only between individual pairs of coils.
- (4) Client device is placed directly in contact with the transmitter.
  - Client device is placed directly in contact with the transmitter.
- (5) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion.)
  - The EUT is a Mobile Power Pack with Wireless Charger.
- (6) The aggregate H-field strengths at 15cm surrounding the device and 20cm above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.
  - Conducted the measurement with the required distance and the test results please refer to the clause 6.

| E-Filed Strength at 15cm surrounding the EUT and 20cm above the top surface of the EUT |                 |                 |                 |                 |                 |                       |                   |        |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------|-------------------|--------|
| Charging   | Test Position A | Test Position B | Test Position C | Test Position D | Test Position E | 50% Limits Test (V/m) | Limits Test (V/m) | Result |
| 1%Battery  | 0.39            | 0.45            | 0.35            | 0.32            | 0.44            | 307                   | 614               | Pass   |
| 50%Battery   | 1.26            | 1.53            | 1.12            | 1.36            | 1.37            | 307                   | 614               | Pass   |
| 99%Battery   | 2.15            | 2.29            | 2.30            | 2.38            | 2.57            | 307                   | 614               | Pass   |
| Standby  | 0.21            | 0.25            | 0.33            | 0.36            | 0.31            | 307                   | 614               | Pass   |

| H-Filed Strength at 15cm surrounding the EUT and 20cm above the top surface of the EUT |                 |                 |                 |                 |                 |                       |                   |        |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------|-------------------|--------|
| Charging   | Test Position A | Test Position B | Test Position C | Test Position D | Test Position E | 50% Limits Test (A/m) | Limits Test (A/m) | Result |
| 1%Battery  | 0.053           | 0.042           | 0.039           | 0.028           | 0.051           | 0.815                 | 1.63              | Pass   |
| 50%Battery   | 0.12            | 0.14            | 0.15            | 0.11            | 0.13            | 0.815                 | 1.63              | Pass   |
| 99%Battery   | 0.37            | 0.44            | 0.39            | 0.42            | 0.40            | 0.815                 | 1.63              | Pass   |
| Standby  | 0.15            | 0.13            | 0.11            | 0.12            | 0.14            | 0.815                 | 1.63              | Pass   |

Note: The aggregate H-filed strengths at 15cm surrounding the device and 20cm above the top surface.

A/m=uT/1.25

## 6. Test Set-up Photo

