

## RF Exposure Considerations

### 1. Measuring Standard

KDB 680106 D01 RF Exposure Wireless Charging Apps v02

### 2. Requirements

According to the item 5.2 of KDB 680106 D01v02:

Inductive wireless power transfer applications that meet all of the following requirements are excluded from submitting an RF exposure evaluation.

- a) Power transfer frequency is less than 1 MHz
- b) Output power from each primary coil is less than 5 watts
- c) 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
- d) Client device is inserted in or placed directly in contact with the transmitter
- e) The maximum coupling surface area of the transmit (charging) device is between 60 cm<sup>2</sup> and 400 cm<sup>2</sup>
- f) Aggregate leakage fields at 10 cm surrounding the device from all simultaneous transmitting coils are demonstrated to be less than 30% of the MPE limit.

Limits For Maximum Permissible Exposure (MPE)

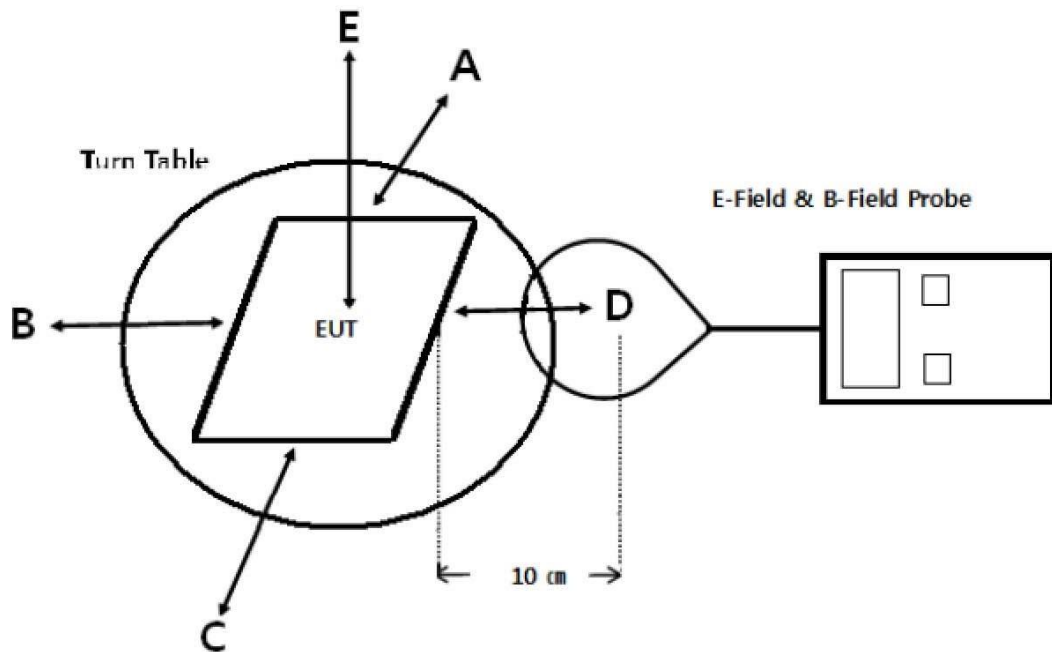
| Frequency range (MHz)  | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|--|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| <b>(A) Limits 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

\*=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 Table 1 of 1.1310(use the 300kHz limits for 150kHz:614V/m,1.63A/m).

### 3. Test Setup



Note: Measurements should be made from all sides and the top of the primary/client pair, with the 10cm measured from the center of the probe(s) to the edge of the device.

### 4. Test Procedure

- 1) The RF exposure test was performed in anechoic chamber.
- 2) The measurement probe was placed at test distance (10cm) which is between the edge of the charger and the geometric center of probe.
- 3) The highest emission level was recorded and compared with limit as soon as measurement of each points (A, B, C, D, E) were completed.
- 4) The EUT was measured according to the dictates of KDB 680106 D01 v02.

Remark;

The EUT's test position A, B, C, D and E is valid for the E and H field measurements.

### 5. Test Equipment List

| Equipment            | Manufacturer | Model No. | Calibration Due |
|----------------------|--------------|-----------|-----------------|
| Magnetic field meter | NARDA        | ELT-400   | Sep. 27, 2018   |

### 6. Test Result

E-Filed Strength at 10 cm from the edges surrounding the EUT (V/m)

| Frequency Range (KHz) | Test Position A | Test Position B | Test Position C | Test Position D | Test Position E | Limits Test (V/m) |
|-----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------------------|
| 112.6-175.1           | 1.46            | 1.79            | 1.47            | 1.58            | 1.55            | 614               |

H-Filed Strength at 10 cm from the edges surrounding the EUT (A/m)

| Frequency Range (KHz) | Test Position A | Test Position B | Test Position C | Test Position D | Test Position E | Limits Test (A/m) |
|-----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------------------|
| 112.6-175.1           | 0.29            | 0.33            | 0.28            | 0.31            | 0.30            | 1.63              |

## 7. Test Set-up Photo

