



RF EXPOSURE EVALUATION METHOD

Response to Inquiry to FCC (Tracking Number 739053)

Inquiry on 05/09/2017 :

Inquiry:

Dear Sir,

For a wireless charger, the transfer frequency is 6.78MHz, For RF exposure, we refer to KDB680106, But it's doesn't meet the 5.2.a requirement, power transfer frequency is less than 1MHz, now we how to go evaluate RF exposure? thank you!

FCC response on 05/10/2017

Thank you for your inquiry. Please see below:

- From the information you provided, due to the device form factor, operating and exposure conditions, you need to perform 10-g extremity SAR test for the 6.78MHz Charger at 10 cm, per KDB 680106 D01, section 3 (3). For additional information, you may also refer to TCB Presentation of April 2016, slide 11.
- Is the Bluetooth transmitting while the charger is charging? If so, you need to consider simultaneous SAR for BLE + 6.78MHz Charger. Please refer to KDB 447498 D01 for the simultaneous SAR condition.

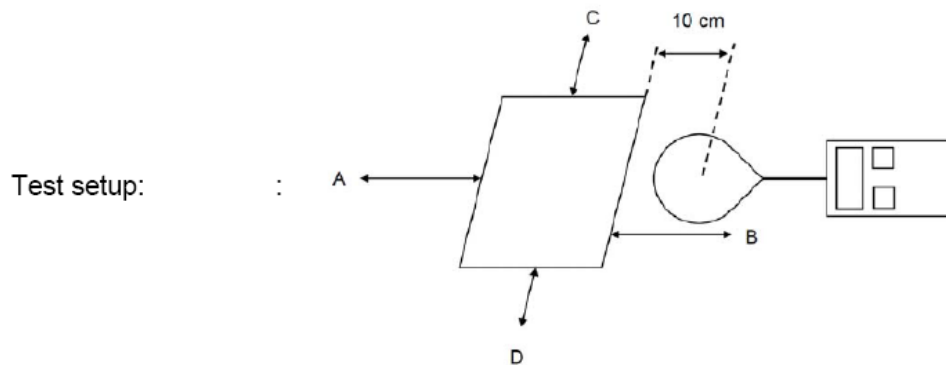
Requirements :

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines. According to §1.1310 and §2.1093 RF exposure is calculated. According KDB680106 D01v02: RF Exposure Wireless Charging Apps v02.

Test Procedure:

- a) The RF exposure test was performed on 360 degree turn table in anechoic chamber.
- b) The measurement probe was placed at test distance (10cm) which is between the edge of the charger and the geometric centre of probe.
- c) The turn table was rotated 360 degree to search of highest strength.
- d) The highest emission level was recorded and compared with limit as soon as measurement of each points (A, B, C, D, E) were completed.
- e) The EUT were measured according to the dictates of KDB 680106D01v02.

Test Setup



According to FCC Part 1.1307, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the commission's guidelines.

Limits for General Population/ Uncontrolled Exposure			
Frequency Range (MHz)	Electric Field Strength(E)(V/m)	Magnetic Field Strength (H)(A/m)	Power Density (S)(mW/cm ²)
0.3-1.34	614	1.63	(100)*
1.34-30	824/f	2.19/f	(180/f ²)*
30-300	27.5	0.073	0.2
300-1500			f/1500
1500-100,000			1.0

Limit:

$$E: 824/6.78\text{MHz} = 121\text{V/m}$$

$$A: 2.19/6.78\text{MHz} = 0.323\text{A/m}$$

Test Results:

E and H field Strength:

E-Field strength at 10 cm from the edges surrounding the EUT(V/m)

Frequency Range (MHz)	Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F	Limits (V/m)
6.78	4.21	4.52	4.78	4.87	4.98	5.04	121

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

Frequency Range (MHz)	Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F	Limits (A/m)
6.78	0.081	0.092	0.076	0.069	0.078	0.068	0.323

The Bluetooth and 6.78M Charge cannot be transmitted simultaneously.

BLE RF power: 4+-1dBm, Max : 5dBm=3.16mW

$$\left[\frac{\text{(max. power of channel, including tune-up tolerance, mW)}}{\text{(min. test separation distance, mm)}} \right] \cdot \left[\sqrt{f(\text{GHz})} \right] = \frac{3.16}{5} \cdot \sqrt{2.480} = 0.99 \leq 3.0$$

Threshold at which no SAR required is 10mw and ≤ 3.0 for 1-g SAR, Separation distance is 5mm.

TEST PHOTO:

