FCC §1.1310 & §2.1091 –MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart §1.1310, 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 Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	$*900/f^2$	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	$*180/f^2$	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz

*= Plane-wave equivalent power density

According with KDB 680106 D01 RF Exposure Wireless Charging Apps v03 clause 3 c)

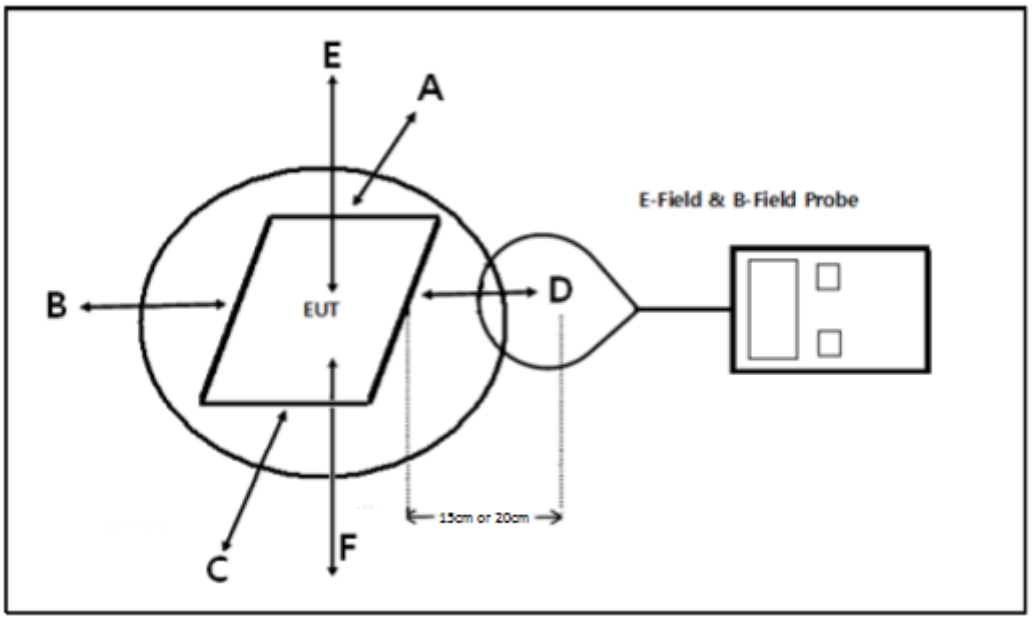
(c) For devices designed for typical desktop applications, such a wireless charging pads, RF exposure evaluation should be conducted assuming a user separation distance of 15 cm. E and H field strength measurements or numerical modeling may be used to demonstrate compliance. Measurements should be made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device. Emissions between 100 kHz to 300 kHz should be assessed versus the limits at 300 kHz in Table 1 of Section 1.1310: 614 V/m and 1.63 A/m. A KDB inquiry is required to determine the applicable exposure limits below 100 kHz.

According to 680106 D01 RF Exposure Wireless Charging App v03 clause 5 b)

Inductive wireless power transfer applications with supporting field strength results and meeting all of the following requirements are not required to submit a KDB inquiry for devices approved using SDoC or a PAG for equipment approved using certification to address RF exposure compliance. However, the responsible party is required to keep a copy of the test report in accordance with KDB 865664 D02. A copy of the test report is to be submitted with the application if the device is approved using certification.

(1) Power transfer frequency is less than 1 MHz..
(2) Output power from each primary coil is less than or equal to 15 watts.
(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.
(4) Client device is placed directly in contact with the transmitter.
(5) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).
(6) The aggregate H-field strengths at 15 cm surrounding the device and 20 cm above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.

EUT Setup



Test Result

(1) Power transfer frequency is less that 1 MHz.
Yes, the transfer frequency is below 110 – 205 kHz.
(2) Output power from each primary coil is less than 15 watts.
Yes, the device has three coils. Only one coil can be operated at a time and the transmit power is less than 5 watts.
(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 including a charging system with only single primary coils is to detect and allow only between individual of coils.
(4) Client device is placed directly in contact with the transmitter.

Yes, client device is placed directly in contact with the transmitter.

(5) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).

Yes, mobile exposure conditions only

(6) The aggregate H-field strengths at 15 cm surrounding the device and 20 cm above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.

Yes, the test result for H and E-filed strength less than 50% of the MPE limit.

Please refer the results below.

FCC

E-Filed Strength

Frequency Range (kHz)	Position A (V/m)	Position B (V/m)	Position C (V/m)	Position D (V/m)	Position E (V/m)	Position F (V/m)	50% Limit Test (V/m)	Limit Test (V/m)
110-205	0.987	0.658	0.924	1.648	0.974	0.863	307	614

Note: Test with 15cm distance from the center of the probe(s) to the edge of the device, distance 20cm used for top surface test.

H-Filed Strength

Frequency Range (kHz)	Position A (A/m)	Position B (A/m)	Position C (A/m)	Position D (A/m)	Position E (A/m)	Position F (A/m)	50% Limit Test (A/m)	Limit Test (A/m)
110-205	0.183	0.182	0.185	0.192	0.186	0.185	0.815	1.63

Note: Test with 15cm distance from the center of the probe(s) to the edge of the device, distance 20cm used for top surface test.