

RF Exposure Evaluation

1 Measuring Standard

KDB 680106 D01 RF Exposure Wireless Charging Apps v03r01

2 Requirements

According to the item 5 of KDB 680106 D01 v03r01:

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

- (1) Power transfer frequency is less than 1MHz.
- (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.

Remark: Meet all the above requirements.

Limits

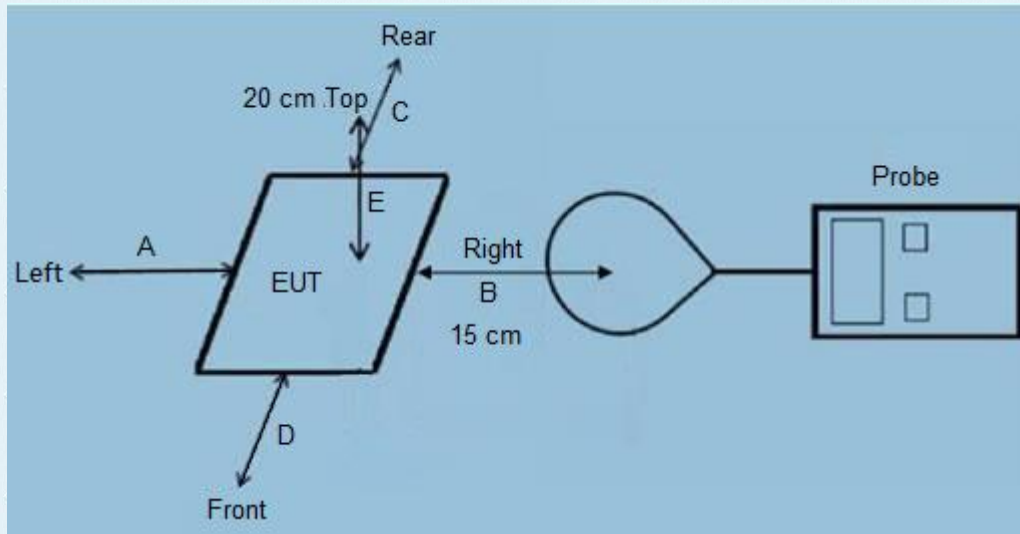
The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

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 Exposures				
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
300-1500	/	/	f/300	6
1500-100,000	/	/	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
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

F=frequency in MHz
 E=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



4 Test Procedure

- 1) The RF exposure test was performed in anechoic chamber.
- 2) The measurement probe was placed at test distance (15 cm from all sides and 20 cm from the top) 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 v03r01.

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

We have tested all load modes and only the worst case of 10W output is shown in the report.

5 Test Results:

The EUT does comply with KDB680106 D01 v03r01 section 5(b).

- (1) Power transfer frequency is less than 1MHz. (Conform)
- (2) Output power from each primary coil is less than or equal to 15 watts. (Conform)
- (3) The system may consist of more than one source primary coils, charging one or more clients. If more than one primary coil is present, the coil pairs may be powered on at the same time. (Conform)
- (4) Client device is placed directly in contact with the transmitter. (Conform)
- (5) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion). (Conform)
- (6) The aggregate H-field strengths anywhere at or beyond 15 cm surrounding the device, and 20 cm away from the surface from all coils that by design can simultaneously transmit, and while those coils are simultaneously energized, are demonstrated to be less than 50% of the applicable MPE limit. (Conform)

6 Test Instruments list

Test Equipment	Manufacturer	Model No.	SN.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
Exposure Level Tester	Narda	ELT-400	N-0231	June. 24 2021	June. 23 2022
Magnetic field probe 100cm ²	Narda	ELT probe 100cm ²	M0675	June. 24 2021	June. 23 2022
Broadband field Meter	Narda	NBM-550	E-1273	June. 24 2021	June. 23 2022
Broadband field Probe	Narda	EF0391	D-0891	June. 24 2021	June. 23 2022

7 Test Result(Worst Case :10W)

E-Filed Strength at 15 cm from the edges surrounding the EUT (V/m)

Frequency Range (MHz)	Output Power	Test Position A	Test Position B	Test Position C	Test Position D	Limits (V/m)
0.1105-0.205	Full Load	0.457	0.464	0.431	0.459	614
	Half Load	0.431	0.408	0.403	0.415	
	Empty Load	0.352	0.368	0.342	0.364	

E-Filed Strength at 20 cm from the top of the EUT (V/m)

Frequency Range (MHz)	Output Power	Test Position E	Limits (V/m)
0.1105-0.205	Full Load	0.478	614
	Half Load	0.453	
	Empty Load	0.372	

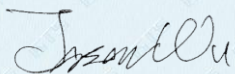
H-Filed Strength at 15 cm from the edges surrounding the EUT (A/m)

Frequency Range (MHz)	Output Power	Test Position A	Test Position B	Test Position C	Test Position D	Limits (A/m)
0.1105-0.205	Full Load	0.135	0.138	0.124	0.129	1.63
	Half Load	0.124	0.127	0.113	0.118	
	Empty Load	0.102	0.112	0.104	0.107	

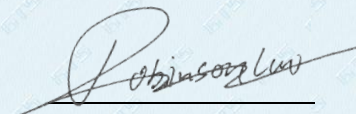
H-Filed Strength at 20 cm from the top of the EUT (A/m)

Frequency Range (MHz)	Output Power	Test Position E	Limits (A/m)
0.110-0.205	Full Load	0.155	1.63
	Half Load	0.146	
	Empty Load	0.124	

Test Engineer:

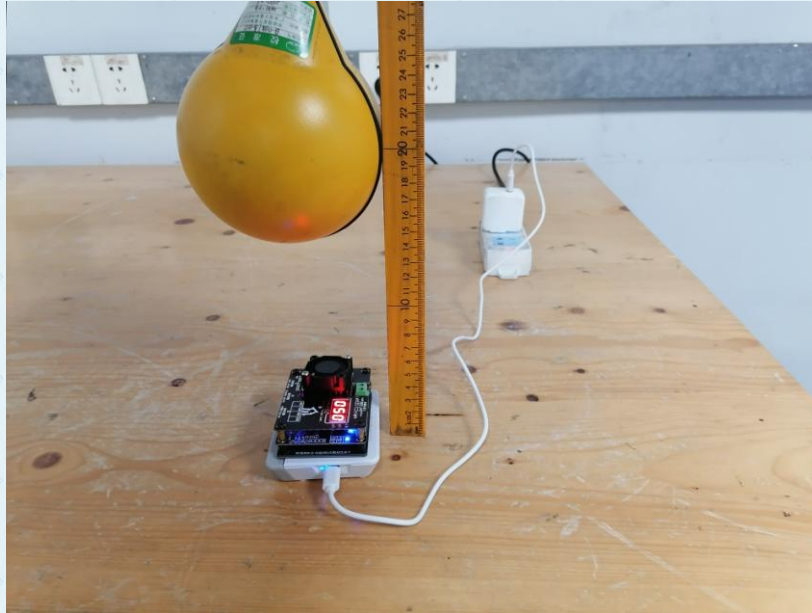


Reviewer:

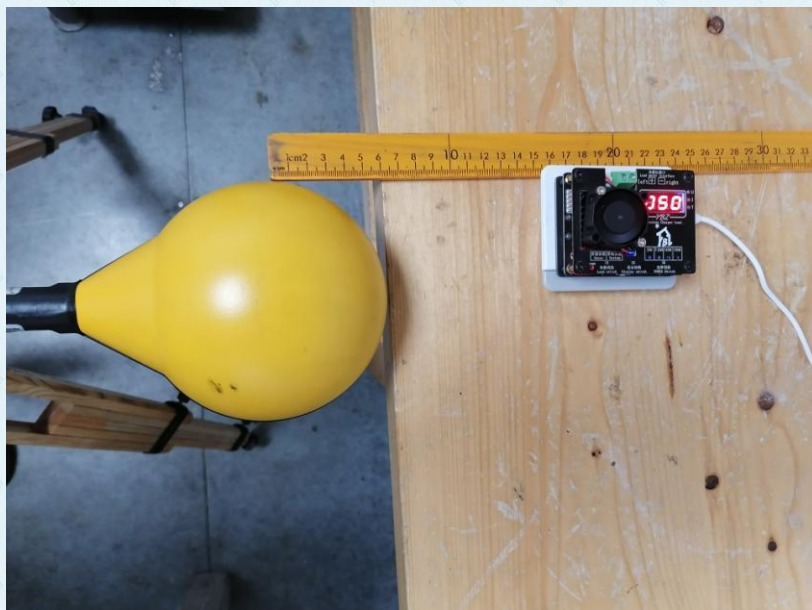


8 Test Set-up Photo

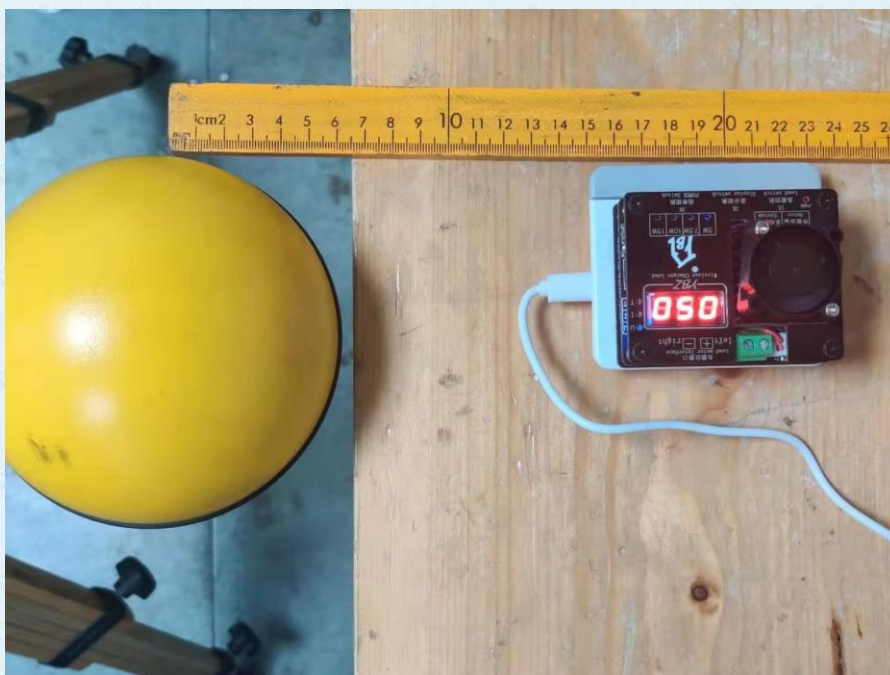
Top



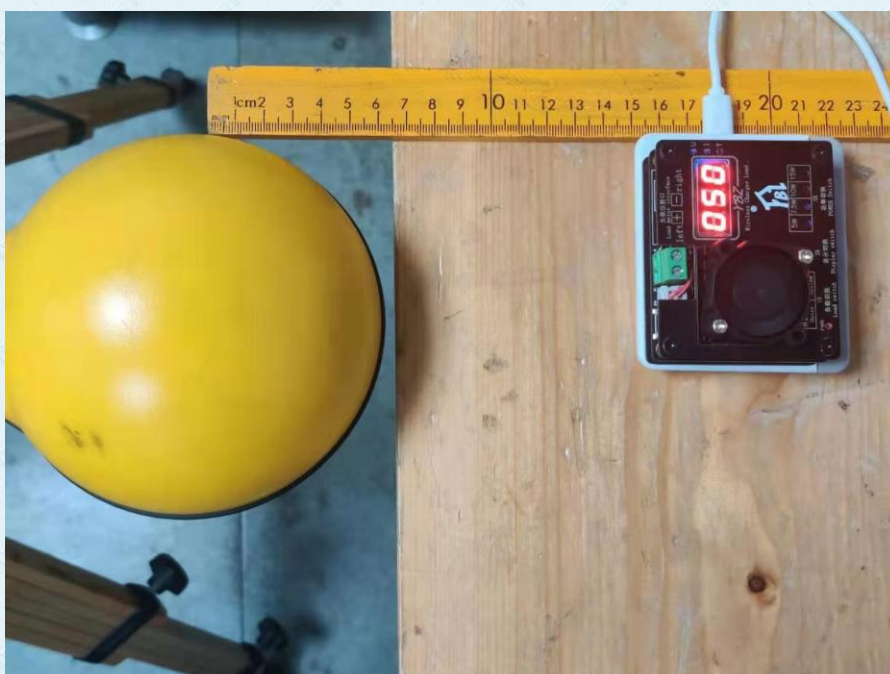
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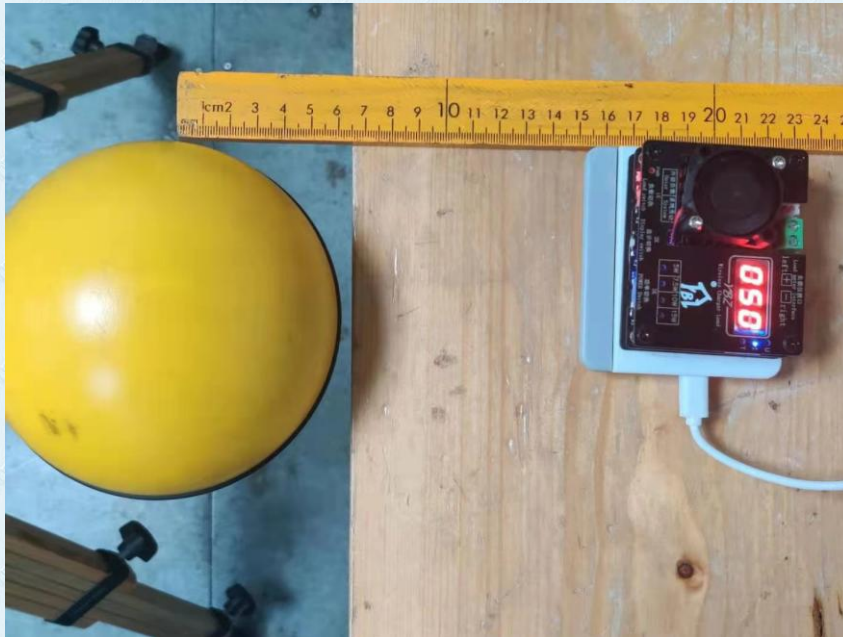
Rear



Left



Right



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