

RF Exposure Evaluation

1 Measuring Standard

KDB680106 D01 RF Exposure Wireless Charging App v03r01;
TCB Workshop, October 2018, 5.2 RF Exposure Procedures

2 Requirements

According to the item 5 of KDB680106 D01 RF Exposure Wireless Charging App v03 r01:

- (1) Power transfer frequency is less than 1 MHz.
Yes
- (2) Output power from each primary coil is less than or equal to 15 watts.
Yes
- (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.
Yes
- (3) Client device is placed directly in contact with the transmitter.
Yes
- (5) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).
No
- (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

Limits

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

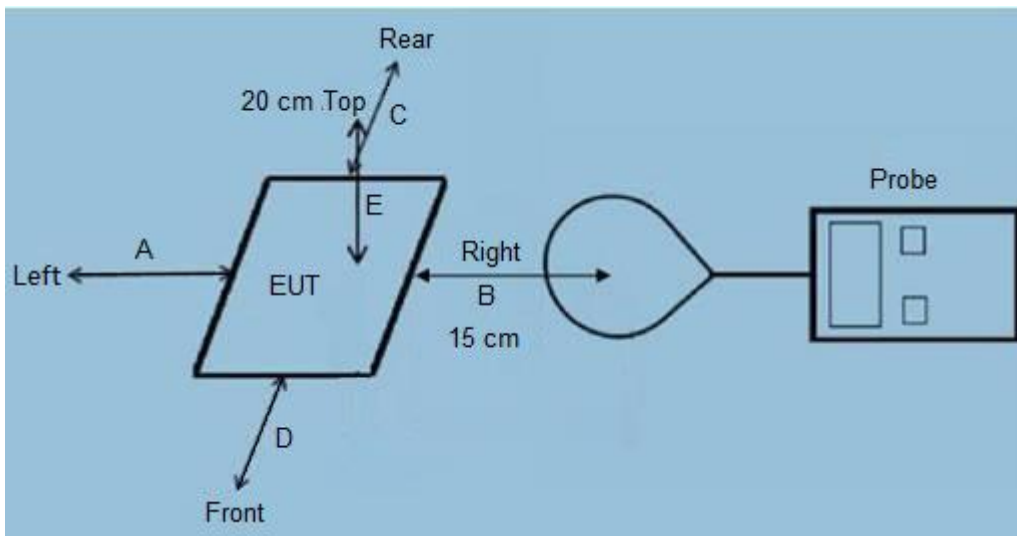
Limits for Maximum Permissible Exposure (MPE)

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

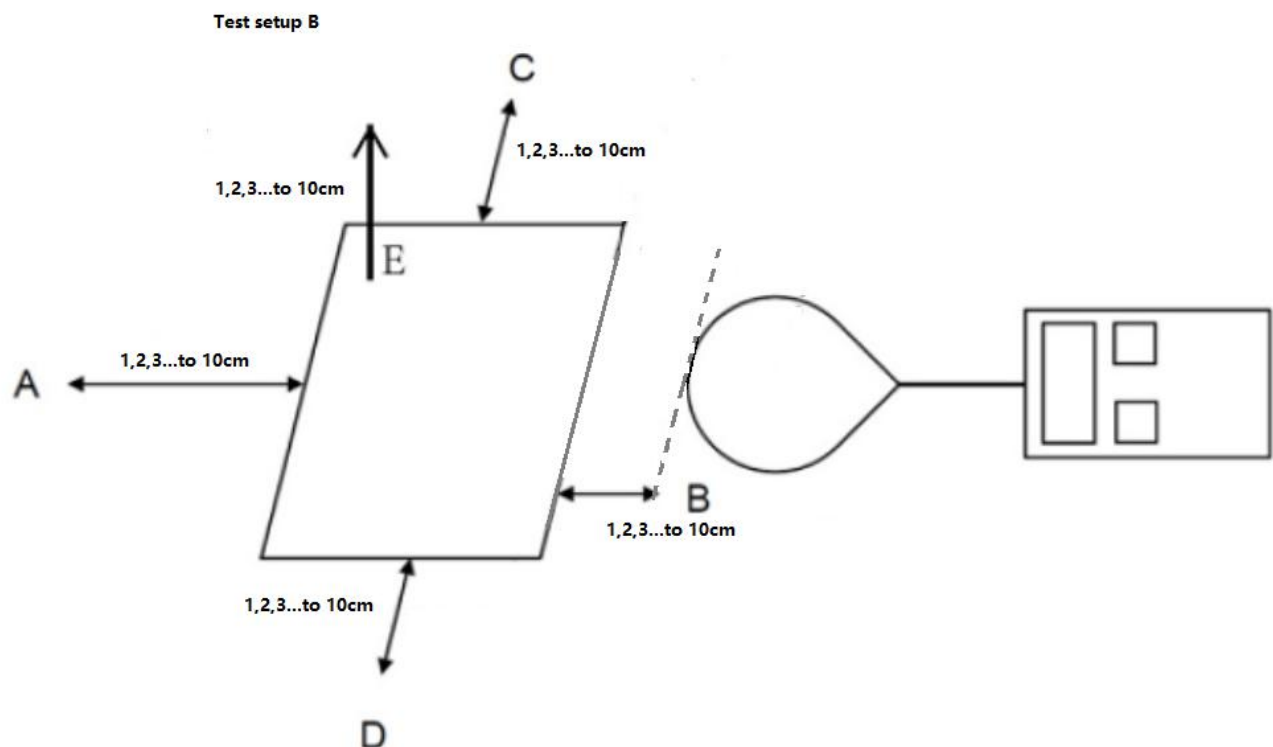
F=frequency in MHz
f=Plane-wave equivalent power density
RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules. The emissions should be within the limits at 300kHz in Table 1 of 1.1310 (use the 300kHz limits for 150kHz: 614V/m, 1.63A/m).

3 Test Setup

A:



B:



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 edges, 20 cm from top) Which is between the edge of the charger and the geometric center of probe, for test setup A;
- 3) In addition to what is described in KDB 680106 D01, please measure and provide magnetic and electrical field strength at a distance 10cm to 1cm at 1cm iteration, i.e. at a distance of 10cm, 9cm, 8cm, 1cm. Which is between the edge of the charger and the edge of probe, for test setup B;
- 4) The highest emission levels recorded and compared with limits as soon as measurement of each point (A, B, C, D, E) were completed;

5) The EUT was measured according to the dictates of KDB680106D01v03 r01; And KDB Tracking Number 671578 ; TCB Workshop, October 2018, 5.2 RF Exposure Procedures

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

5 Test Instruments list

Equipment	Manufacturer	Model No.	Calibration Due
Magnetic field meter and probe	NARDA	ELT-400	Mar. 07, 2022
Mobile Phone	SAMSUNG	SM-G9350	/

6 Test Result

Test Result for Test setup A:

Note: Both the power supply mode and the internal battery mode were tested, only worse case AC power is reported.

E-Field Strength at (15 cm from edges A,B,C,D, 20 cm from top E) surrounding the EUT (V/m)

Charging Load Worse case	Test Position A (V/m)	Test Position B (V/m)	Test Position C (V/m)	Test Position D (V/m)	Test Position E (V/m)	Limits (V/m)
<5%	1.53	1.65	1.72	1.82	1.55	614
50%	1.34	1.49	1.66	1.53	1.32	614
>90 %	1.22	1.32	1.44	1.55	1.34	614

H-Field Strength at (15 cm from edges A,B,C,D, 20 cm from top E) surrounding the EUT (A/m)

Charging Load Worse case	Test Position A (A/m)	Test Position B (A/m)	Test Position C (A/m)	Test Position D (A/m)	Test Position E (A/m)	Limits (A/m)
<5%	0.205	0.185	0.194	0.185	0.185	1.63
50%	0.192	0.184	0.195	0.175	0.175	1.63
>90 %	0.195	0.173	0.175	0.155	0.166	1.63

Test Result for Test setup B: (internal battery mode)

<5% ,50% ,>90% load all have been tested ,only worse case Max load (<5% mode) is reported.

E-Filed Strength (distance 10cm to 1cm at 1cm iteration, i.e. at a distance of 10cm, 9cm, 8cm, 1cm, Which is between the edge of the charger and the edge of probe,) surrounding the EUT (V/m)

Test distance (cm)	Test Position A (V/m)	Test Position B (V/m)	Test Position C (V/m)	Test Position D (V/m)	Test Position E (V/m)	Limits (V/m)
1	2.15	2.30	2.32	2.44	2.12	614
2	2.11	2.22	2.22	2.33	1.98	614
3	1.98	2.12	2.01	2.01	1.96	614
4	1.95	1.98	1.98	1.99	1.95	614
5	1.85	1.76	1.95	1.92	1.92	614
6	1.83	1.75	1.85	1.88	1.87	614
7	1.76	1.72	1.72	1.87	1.85	614
8	1.73	1.68	1.66	1.85	1.82	614
9	1.66	1.66	1.64	1.75	1.74	614
10	1.63	1.65	1.62	1.72	1.65	614

H-Filed Strength (distance 10cm to 1cm at 1cm iteration, i.e. at a distance of 10cm, 9cm, 8cm, 1cm, Which is between the edge of the charger and the edge of probe,) surrounding the EUT (A/m)

Test distance (cm)	Test Position A (A/m)	Test Position B (A/m)	Test Position C (A/m)	Test Position D (A/m)	Test Position E (A/m)	Limits (A/m)
1	0.299	0.285	0.275	0.266	0.285	1.63
2	0.288	0.256	0.253	0.258	0.277	1.63
3	0.277	0.253	0.251	0.248	0.272	1.63
4	0.266	0.252	0.248	0.234	0.266	1.63
5	0.248	0.243	0.243	0.232	0.263	1.63
6	0.238	0.235	0.234	0.228	0.258	1.63
7	0.235	0.232	0.225	0.226	0.245	1.63
8	0.227	0.225	0.215	0.224	0.236	1.63
9	0.215	0.205	0.206	0.215	0.228	1.63
10	0.207	0.204	0.202	0.208	0.218	1.63

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Test date: Oct. 13, 2021

Review date: Oct. 14, 2021

7TestSet-up Photo

