RF Exposure Evaluation

1Measuring Standard

KDB680106 D01 RF Exposure Wireless Charging App v03r01;

TCB Workshop, October 2018, 5.2 RF Exposure Procedures

2Requirements

Accordingto theitem 5of 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

Thecriterialistedinthefollowingtableshallbeusedtoevaluatetheenvironmentimpactof humanexposure toradiofrequency(RF)radiationasspecifiedin1.1307(b)

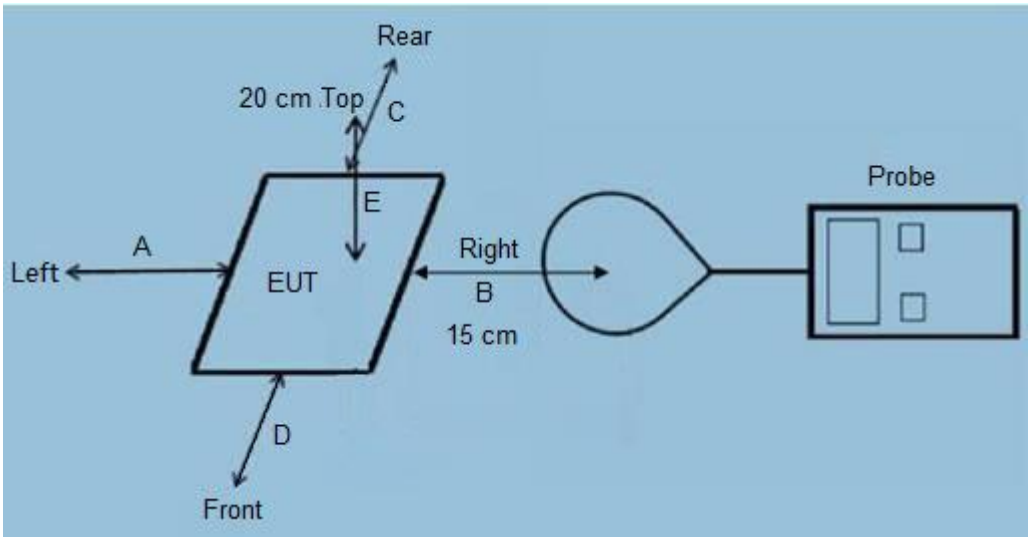
LimitsforMaximumPermissibleExposure(MPE)

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

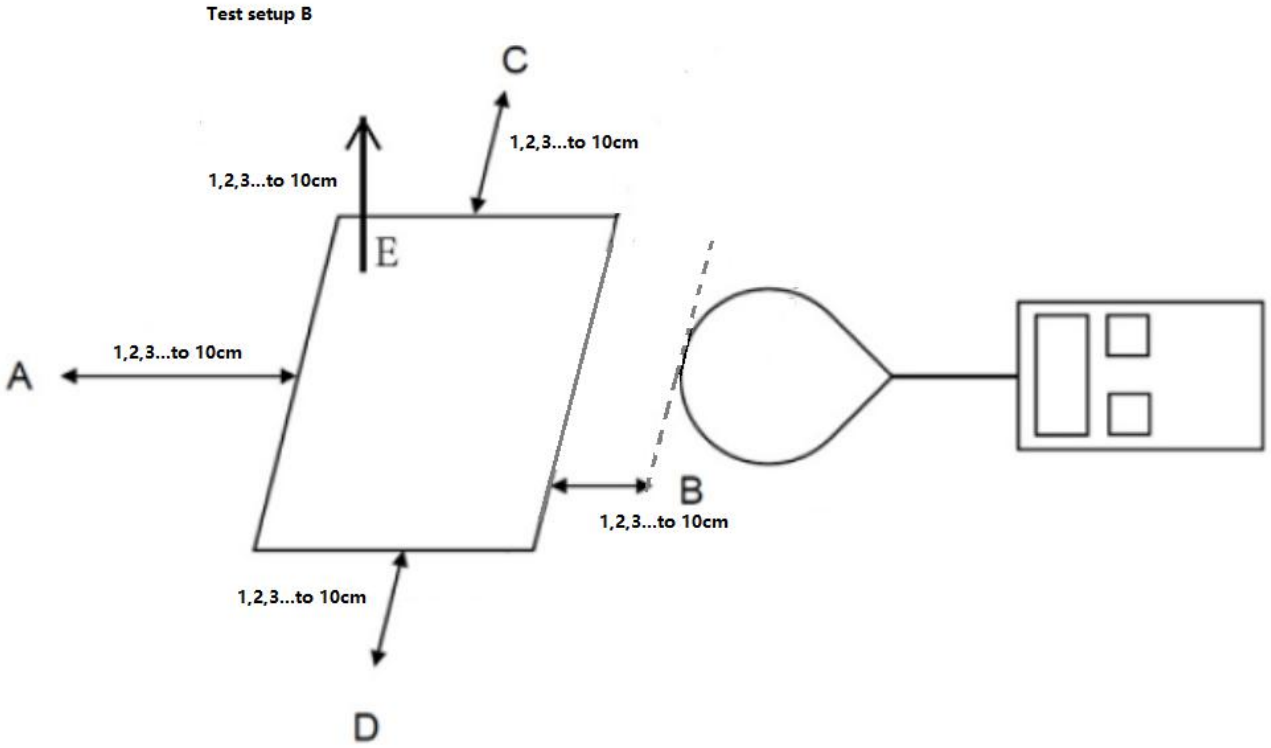
F=frequency in MHz
*=Plane-wave equivalent power density
RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules. The emissions should be within the limits at 300kHz in Table 1 of 1.1310(use the 300kHz limits for 150kHz:614V/m,1.63A/m).

3TestSetup

A:



B:



4TestProcedure

1) TheRFexposuretestwasperformedin anechoicchamber;

2) <u>Themeasurementprobewasplacedattestdistance(15 cm from edges, 20 cm from top) Whichis betweentheedgeof thechargerandthegeometriccenterof probe, for test setup A;</u>

3) <u>In addition to what is described in KDB 680106 D01, please measure and provide magnetic and electricalfield strength at a distance 10cm to 1cm at 1cm iteration, i.e. at a distance of 10cm, 9cm, 8cm, ……. 1cm. Whichis betweentheedgeof thechargerandtheedgeofof probe, for test setup B;</u>

4) Thehighestemissionlevelawsrecordedandcomparedwithlimitassoonas measurementof eachpoints(A,B, C,D, E)werecompleted;

5) TheEUTwasmeasuredaccordingtothedictatesofKDB680106D01v03 r01; And KDB Tracking Number 671578 ; TCB Workshop, October 2018, 5.2 RF Exposure Procedures

Remark：TheEUT'stestpositionA, B,C, DandE isvalidfortheEandHfieldmeasurements.

5TestInstruments list

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

6TestResult

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-FiledStrengthat(15 cm from edges A,B,C,D, 20 cm from top E)surroundingtheEUT(V/m)

Charging Load Worse case	Test PositionA(V/m)	Test PositionB(V/m)	Test PositionC(V/m)	Test PositionD(V/m)	Test PositionE(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-FiledStrengthat(15 cm from edges A,B,C,D, 20 cm from top E)surroundingtheEUT(A/m)

Charging Load Worse case	Test PositionA(A/m)	Test PositionB(A/m)	Test PositionC(A/m)	Test PositionD(A/m)	Test PositionE(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:（internalbatterymode）

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

E-FiledStrengthat(distance 10cm to 1cm at 1cm iteration, i.e. at a distance of 10cm, 9cm, 8cm, ……. 1cm, Whichis betweentheedgeof thechargerandtheedgeofof probe,)surroundingtheEUT(V/m)

Test distance (cm)	Test PositionA(V/m)	Test PositionB(V/m)	Test PositionC(V/m)	Test PositionD(V/m)	Test PositionE(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	198	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-FiledStrengthat(distance 10cm to 1cm at 1cm iteration, i.e. at a distance of 10cm, 9cm, 8cm, ……. 1cm, Whichis betweentheedgeof thechargerandtheedgeofof probe,)surroundingtheEUT(A/m)

Test distance (cm)	Test PositionA(A/m)	Test PositionB(A/m)	Test PositionC(A/m)	Test PositionD(A/m)	Test PositionE(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

Brave. Zeng.

Beryl zhao

TestEngineer: Brave Zeng Reviewer:Beryl Zhao

Test date: Oct. 13, 2021 Review date: Oct. 14, 2021

7TestSet-up Photo