

RF Exposure Evaluation

FCC ID; 2AWUOYTP1-1

1 Measuring Standard

KDB 680106 D01 RF Exposure Wireless Charging Apps v03

2 Requirements

According to the item 5 of KDB 680106 D01v03:

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

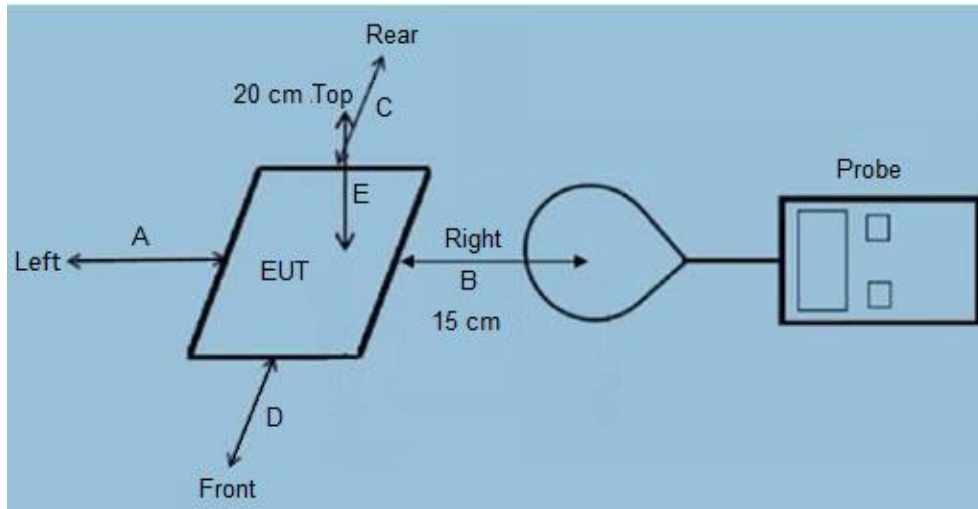
The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

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
*=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

For mobile RF exposure

- The RF exposure test was performed on 360 degree turn table in anechoic chamber.
- The measurement probe was placed at test distance (15cm) which is between the edge of the charger and the geometric center of probe.
- The turn table was rotated 360 degree to search of highest strength.
- The highest emission level was recorded and compared with limit as soon as measurement of each points (A, B, C, D, E) were completed.
- The EUT were measured according to the dictates of KDB 680106D01v03.

For portable RF exposure

- The RF exposure test was performed on 360 degree turn table in anechoic chamber.
- The measurement probe was placed at test distance (0cm) which is between the edge of the charger and the geometric center of probe.
- The turn table was rotated 360 degree to search of highest strength.
- The highest emission level was recorded and compared with limit as soon as measurement of each points (A, B, C, D, E, F) were completed.
- Repeated measured (a) – (d) at measure distance 5cm, 10cm and 15cm.
- The EUT were measured according to the dictates of KDB 680106D01v03.

5 Equipment Approval Considerations

The EUT does comply with KDB 680106 D01 as follow table.

Requirements of KDB 680106 D01	Yes / No	Description
Power transfer frequency is less than 1 MHz	Yes	The device operate in the frequency range 110KHz~205KHz
Output power from each primary coil is less than 15 watts	Yes	The maximum output power for each primary coil is 10W.
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.	No	The transfer system includes five pairs of coils, it can detect and only two pairs of primary and secondary coils work simoltalously at the same time.
Client device is placed directly in contact with the transmitter.	Yes	Client device is placed directly in contact with the transmitter.
Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).	No	Mixed mobile and portable exposure conditions
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 EUT 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.

6 Description of the test mode

Equipment under test was operated during the measurement under the following conditions:

☒ Charging and communication mode

Test Modes:		
Mode 1	AC/DC Adapter (5V/3A) + EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: <1%)	Record
Mode 2	AC/DC Adapter (5V/3A) + EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: <50%)	Record
Mode 3	AC/DC Adapter (5V/3A) + EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: 100%)	Record
Mode 4	AC/DC Adapter (5V/3A) + EUT + Mobile Phone1 (Battery Status: <1%)	Pre-tested
Mode 5	AC/DC Adapter (5V/3A) + EUT + Mobile Phone1 (Battery Status: <50%)	Pre-tested
Mode 6	AC/DC Adapter (5V/3A) + EUT + Mobile Phone1 (Battery Status: 100%)	Pre-tested
Mode 7	AC/DC Adapter (5V/3A) + EUT + Mobile Phone2 (Battery Status: <1%)	Pre-tested
Mode 8	AC/DC Adapter (5V/3A) + EUT + Mobile Phone2 (Battery Status: <50%)	Pre-tested
Mode 9	AC/DC Adapter (5V/3A) + EUT + Mobile Phone2 (Battery Status: 100%)	Pre-tested
Mode 10	AC/DC Adapter (9V/2A) + EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: <1%)	Pre-tested
Mode 11	AC/DC Adapter (9V/2A) + EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: <50%)	Pre-tested
Mode 12	AC/DC Adapter (9V/2A) + EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: 100%)	Pre-tested
Mode 13	AC/DC Adapter (9V/2A) + EUT + Mobile Phone1 (Battery Status: <1%)	Pre-tested
Mode 14	AC/DC Adapter (9V/2A) + EUT + Mobile Phone1 (Battery Status: <50%)	Pre-tested

Mode 15	AC/DC Adapter (9V/2A) + EUT + Mobile Phone1 (Battery Status: 100%)	Pre-tested
Mode 16	AC/DC Adapter (9V/2A) + EUT + Mobile Phone2 (Battery Status: <1%)	Pre-tested
Mode 17	AC/DC Adapter (9V/2A) + EUT + Mobile Phone2 (Battery Status: <50%)	Pre-tested
Mode 18	AC/DC Adapter (9V/2A) + EUT + Mobile Phone2 (Battery Status: 100%)	Pre-tested
Mode 19	AC/DC Adapter (12V/1.5A) + EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: <1%)	Pre-tested
Mode 20	AC/DC Adapter (12V/1.5A) + EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: <50%)	Pre-tested
Mode 21	AC/DC Adapter (12V/1.5A) + EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: 100%)	Pre-tested
Mode 22	AC/DC Adapter (12V/1.5A) + EUT + Mobile Phone1 (Battery Status: <1%)	Pre-tested
Mode 23	AC/DC Adapter (12V/1.5A)+ EUT + Mobile Phone1 (Battery Status: <50%)	Pre-tested
Mode 24	AC/DC Adapter (12V/1.5A)+ EUT + Mobile Phone1 (Battery Status: 100%)	Pre-tested
Mode 25	AC/DC Adapter (12V/1.5A)+ EUT + Mobile Phone2 (Battery Status: <1%)	Pre-tested
Mode 26	AC/DC Adapter (12V/1.5A) + EUT + Mobile Phone2 (Battery Status: <50%)	Pre-tested
Mode 27	AC/DC Adapter (12V/1.5A)+ EUT + Mobile Phone2 (Battery Status: 100%)	Pre-tested
Mode 28	AC/DC Adapter (5V/3A) + EUT + Mobile Phone3 (Battery Status: <1%)	Pre-tested
Mode 29	AC/DC Adapter (5V/3A) + EUT + Mobile Phone3 (Battery Status: <50%)	Pre-tested
Mode 30	AC/DC Adapter (5V/3A) + EUT + Mobile Phone3 (Battery Status: 100%)	Pre-tested
Mode 31	AC/DC Adapter (9V/2A) + EUT + Mobile Phone3 (Battery Status: <1%)	Pre-tested
Mode 32	AC/DC Adapter (9V/2A) + EUT + Mobile Phone3 (Battery Status: <50%)	Pre-tested
Mode 33	AC/DC Adapter (9V/2A) + EUT + Mobile Phone3 (Battery Status: 100%)	Pre-tested
Mode 34	AC/DC Adapter (12V/1.5A) + EUT + Mobile Phone3 (Battery Status: <1%)	Pre-tested
Mode 35	AC/DC Adapter (12V/1.5A)+ EUT + Mobile Phone3 (Battery Status: <50%)	Pre-tested
Mode 36	AC/DC Adapter (12V/1.5A)+ EUT + Mobile Phone3 (Battery Status: 100%)	Pre-tested
Mode 37	EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: <1%)	Record
Mode 38	EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: <50%)	Record
Mode 39	EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: 100%)	Record
Mode 40	EUT + Mobile Phone1 (Battery Status: <1%)	Pre-tested
Mode 41	EUT + Mobile Phone1 (Battery Status: <50%)	Pre-tested
Mode 42	EUT + Mobile Phone1 (Battery Status: 100%)	Pre-tested
Mode 43	EUT + Mobile Phone2 (Battery Status: <1%)	Pre-tested
Mode 44	EUT + Mobile Phone2 (Battery Status: <50%)	Pre-tested
Mode 45	EUT + Mobile Phone2 (Battery Status: 100%)	Pre-tested
Mode 46	EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: <1%)	Pre-tested
Mode 47	EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: <50%)	Pre-tested
Mode 48	EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: 100%)	Pre-tested
Mode 49	EUT + Mobile Phone1 (Battery Status: <1%)	Pre-tested
Mode 50	EUT + Mobile Phone1 (Battery Status: <50%)	Pre-tested

Mode 51	EUT + Mobile Phone1 (Battery Status: 100%)	Pre-tested
Mode 52	EUT + Mobile Phone2 (Battery Status: <1%)	Pre-tested
Mode 53	EUT + Mobile Phone2 (Battery Status: <50%)	Pre-tested
Mode 54	EUT + Mobile Phone2 (Battery Status: 100%)	Pre-tested
Mode 55	EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: <1%)	Pre-tested
Mode 56	EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: <50%)	Pre-tested
Mode 57	EUT + Mobile Phone1 + Mobile Phone2 (Battery Status: 100%)	Pre-tested
Mode 58	EUT + Mobile Phone1 (Battery Status: <1%)	Pre-tested
Mode 59	EUT + Mobile Phone1 (Battery Status: <50%)	Pre-tested
Mode 60	EUT + Mobile Phone1 (Battery Status: 100%)	Pre-tested
Mode 61	EUT + Mobile Phone2 (Battery Status: <1%)	Pre-tested
Mode 62	EUT + Mobile Phone2 (Battery Status: <50%)	Pre-tested
Mode 63	EUT + Mobile Phone2 (Battery Status: 100%)	Pre-tested
Mode 64	EUT + Mobile Phone3 (Battery Status: <1%)	Pre-tested
Mode 65	EUT + Mobile Phone3 (Battery Status: <50%)	Pre-tested
Mode 66	EUT + Mobile Phone3 (Battery Status: 100%)	Pre-tested
Mode 67	EUT + Mobile Phone3 (Battery Status: <1%)	Pre-tested
Mode 68	EUT + Mobile Phone3 (Battery Status: <50%)	Pre-tested
Mode 69	EUT + Mobile Phone3 (Battery Status: 100%)	Pre-tested
Mode 70	EUT + Mobile Phone3 (Battery Status: <1%)	Pre-tested
Mode 71	EUT + Mobile Phone3 (Battery Status: <50%)	Pre-tested
Mode 72	EUT + Mobile Phone3 (Battery Status: 100%)	Pre-tested

Note: 1: All test modes were pre-tested, but we only recorded the worst case in this report.

2: If the middle coil is detected to be charged, the coils on both sides cannot be charged 3

7 Description of Support Units

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Technical Parameters	Certificate	Provided by
Adapter	CHENYANG ELECTRONICS	CD107	Input: 100-240V~, 50/60Hz, 0.5A Output: 5V---2A / 9V---1.8A	CE/FCC	laboratory
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/

8 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 29 2019	June 28 2020
Magnetic field probe 100cm ²	Narda	ELT probe 100cm ²	M0675	June 29 2019	June 28 2020

9 Test Result

For mobile exposure

E-Field Strength at 15 cm from the edges surrounding the EUT and 15cm from the top surface of the EUT

Test port	Charging Battery Level	Frequency Range (MHz)	Measured E-Field Strength Values (V/m)					FCC E-Field Strength 50% Limits (V/m)	FCC E-Field Strength Limits (V/m)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E		
Phone port 1	1%	0.136	2.38	2.62	2.01	2.19	3.52	307.0	614.0
	50%	0.136	1.89	1.75	1.15	1.54	2.74	307.0	614.0
	99%	0.136	1.42	1.32	1.09	1.33	2.07	307.0	614.0
Phone port 2	1%	0.136	2.46	2.47	2.11	2.22	3.44	307.0	614.0
	50%	0.136	1.57	2.12	1.27	1.69	2.87	307.0	614.0
	99%	0.136	1.32	1.31	1.19	1.34	2.29	307.0	614.0

H-Field Strength at 15 cm from the edges surrounding the EUT and 15cm from the top surface of the EUT

Test port	Charging Battery Level	Frequency Range (MHz)	Measured E-Field Strength Values (A/m)					FCC H-Field Strength 50% Limits (A/m)	FCC H-Field Strength Limits (A/m)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E		
Phone port 1	1%	0.136	0.329	0.366	0.311	0.328	0.432	0.815	1.63
	50%	0.136	0.278	0.301	0.217	0.243	0.398	0.815	1.63
	99%	0.136	0.215	0.272	0.186	0.203	0.301	0.815	1.63
Phone port 2	1%	0.136	0.342	0.379	0.321	0.307	0.436	0.815	1.63
	50%	0.136	0.269	0.315	0.239	0.281	0.398	0.815	1.63
	99%	0.136	0.192	0.249	0.211	0.222	0.273	0.815	1.63

H-Field Strength at 20cm from the top surface of the EUT

Test port	Charging Battery Level	Frequency Range (MHz)	Measured E-Field Strength Values (A/m)	FCC H-Field Strength 50% Limits (A/m)	FCC H-Field Strength Limits (A/m)
			Test Position E		
Phone port 1	1%	0.136	0.372	0.815	1.63
	50%	0.136	0.301	0.815	1.63
	99%	0.136	0.237	0.815	1.63
Phone port 2	1%	0.136	0.362	0.815	1.63
	50%	0.136	0.311	0.815	1.63
	99%	0.136	0.242	0.815	1.63

For portable exposure

E-Field Strength at 0 from the edges surrounding the EUT

Test port	Charging Battery Level	Frequency Range (MHz)	Measured E-Field Strength Values (V/m)						FCC E-Field Strength Limits (V/m)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F	
Phone port 1	1%	0.136	8.50	8.71	8.06	8.24	9.70	8.54	614.0
	50%	0.136	7.85	7.65	7.04	7.43	8.76	7.76	614.0
	99%	0.136	7.66	7.51	7.21	7.56	8.31	7.72	614.0
Phone port 2	1%	0.136	8.53	8.56	8.11	8.22	9.57	8.43	614.0
	50%	0.136	7.72	8.23	7.35	7.79	9.08	8.01	614.0
	99%	0.136	7.37	7.33	7.19	7.36	8.45	7.59	614.0

E-Field Strength at 5 from the edges surrounding the EUT

Test port	Charging Battery Level	Frequency Range (MHz)	Measured E-Field Strength Values (V/m)						FCC E-Field Strength Limits (V/m)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F	
Phone port 1	1%	0.136	7.35	7.55	6.90	7.09	8.50	7.32	614.0
	50%	0.136	6.69	6.59	5.81	6.27	7.62	6.60	614.0
	99%	0.136	6.50	6.37	6.10	6.34	7.21	6.52	614.0
Phone port 2	1%	0.136	7.32	7.32	6.95	7.06	8.43	7.27	614.0
	50%	0.136	6.56	7.01	6.15	6.61	7.92	6.81	614.0
	99%	0.136	6.28	6.17	6.07	6.13	7.24	6.46	614.0

E-Field Strength at 10 from the edges surrounding the EUT

Test port	Charging Battery Level	Frequency Range (MHz)	Measured E-Field Strength Values (V/m)						FCC E-Field Strength Limits (V/m)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F	
Phone port 1	1%	0.136	5.37	5.54	4.89	5.01	6.51	5.37	614.0
	50%	0.136	4.62	4.51	3.87	4.26	5.59	4.52	614.0
	99%	0.136	4.49	4.36	4.02	4.33	5.20	4.57	614.0
Phone port 2	1%	0.136	5.31	5.39	4.94	5.05	6.45	5.26	614.0
	50%	0.136	4.57	5.07	4.18	4.60	5.91	4.85	614.0
	99%	0.136	4.20	4.11	4.07	4.19	5.27	4.35	614.0

E-Field Strength at 15 from the edges surrounding the EUT

Test port	Charging Battery Level	Frequency Range (MHz)	Measured E-Field Strength Values (V/m)						FCC E-Field Strength Limits (V/m)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F	
Phone port 1	1%	0.136	2.55	2.72	2.06	2.22	3.75	2.50	614.0
	50%	0.136	1.85	1.68	1.04	1.43	2.70	1.76	614.0
	99%	0.136	1.60	1.57	1.20	1.50	2.37	1.70	614.0
Phone port 2	1%	0.136	2.53	2.51	2.11	2.22	3.59	2.43	614.0
	50%	0.136	1.71	2.25	1.31	1.75	3.02	2.02	614.0
	99%	0.136	1.38	1.33	1.12	1.37	2.40	1.57	614.0

H-Field Strength at 0 cm from the edges surrounding the EUT

Test port	Charging Battery Level	Frequency Range (MHz)	Measured E-Field Strength Values (A/m)						FCC H-Field Strength Limits (A/m)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F	
Phone port 1	1%	0.136	0.882	0.889	0.794	0.811	1.045	0.855	1.63
	50%	0.136	0.819	0.825	0.680	0.714	0.999	0.792	1.63
	99%	0.136	0.795	0.820	0.694	0.731	0.941	0.753	1.63
Phone port 2	1%	0.136	0.805	0.812	0.722	0.700	0.962	0.777	1.63
	50%	0.136	0.889	0.917	0.792	0.829	1.079	0.851	1.63
	99%	0.136	0.613	0.692	0.619	0.625	0.806	0.632	1.63

H-Field Strength at 5 cm from the edges surrounding the EUT

Test port	Charging Battery Level	Frequency Range (MHz)	Measured E-Field Strength Values (A/m)						FCC H-Field Strength Limits (A/m)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F	
Phone port 1	1%	0.136	0.615	0.622	0.527	0.545	0.771	0.579	1.63
	50%	0.136	0.552	0.545	0.421	0.447	0.732	0.525	1.63
	99%	0.136	0.526	0.553	0.438	0.447	0.669	0.469	1.63
Phone port 2	1%	0.136	0.542	0.542	0.447	0.433	0.685	0.505	1.63
	50%	0.136	0.625	0.641	0.519	0.571	0.814	0.584	1.63
	99%	0.136	0.393	0.427	0.340	0.358	0.545	0.365	1.63

H-Field Strength at 10cm from the edges surrounding the EUT

Test port	Charging Battery Level	Frequency Range (MHz)	Measured E-Field Strength Values (A/m)						FCC H-Field Strength Limits (A/m)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F	
Phone port 1	1%	0.136	0.440	0.456	0.361	0.372	0.612	0.413	1.63
	50%	0.136	0.386	0.376	0.255	0.281	0.566	0.359	1.63
	99%	0.136	0.360	0.387	0.265	0.278	0.502	0.321	1.63
Phone port 2	1%	0.136	0.372	0.379	0.281	0.267	0.526	0.336	1.63
	50%	0.136	0.455	0.475	0.359	0.405	0.640	0.418	1.63
	99%	0.136	0.231	0.250	0.187	0.192	0.373	0.192	1.63

H-Field Strength at 15cm from the edges surrounding the EUT

Test port	Charging Battery Level	Frequency Range (MHz)	Measured E-Field Strength Values (A/m)						FCC H-Field Strength Limits (A/m)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F	
Phone port 1	1%	0.136	0.345	0.348	0.253	0.270	0.504	0.310	1.63
	50%	0.136	0.278	0.271	0.147	0.176	0.457	0.257	1.63
	99%	0.136	0.252	0.270	0.152	0.170	0.398	0.213	1.63
Phone port 2	1%	0.136	0.267	0.271	0.173	0.159	0.421	0.220	1.63
	50%	0.136	0.351	0.368	0.257	0.295	0.540	0.310	1.63
	99%	0.136	0.120	0.151	0.073	0.084	0.265	0.093	1.63

10 Simultaneous E-Filed Strength and H-Filed Strength

KDB 447498 points for simultaneous transmission on far-field measurement, while for below 30 MHz usually measured at near-field. KDB680106 require aggregate leakage fields at 15 cm surrounding the device from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit;

KDB680106 can accept using field strength, power density, SAR measurements or computational modeling etc., the specific authorization requirements will be determined based on the results of the RF exposure evaluation.

Test labs suggest use Computational modelling to calculate Nerve Stimulation BRs;

Computational modelling, such as finite-difference time-domain (FDTD) may be used to demonstrate compliance with FCC § 1.1310 limits requirement,

Basic Calculations - The following calculations may be used to evaluate systems without consideration for the effects of phase resulting from multiple frequency and/or multiple antennas co-located in the measurement space, which may overestimate the actual result. If the result exceeds the limits, the advanced calculations described in follows may be used.

$$E_{AVG} = \frac{1}{n} \sum_{i=1}^n (E_{MaxRMS})_i$$

Where:

E-field measurements

E_{AVG} = Spatial average

E_{MaxRMS} = E-field at a measurement point

N = Number of spatially averaged points

And

$$H_{AVG} = \frac{1}{n} \sum_{i=1}^n (H_{MaxRMS})_i$$

Where:

H-field levels of magnetic field strength

H_{AVG} = Spatial average

H_{MaxRMS} = H-field at a measurement point

N = Number of spatially averaged points

For mobile exposure

E-Filed Strength at 15 cm from the edges surrounding the EUT and 15 cm above the top surface

Spatial Average	Charging Battery Level	Frequency Range (MHz)	Measured E-Field Strength Values (V/m)					FCC E-Field Strength 50% Limits (V/m)	FCC E-Field Strength Limits (V/m)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E		
E_{AVG}	1%	0.136	2.420	2.545	2.060	2.205	3.480	307.0	614.0
	50%	0.136	1.730	1.935	1.210	1.615	2.805	307.0	614.0
	99%	0.136	1.370	1.315	1.140	1.335	2.180	307.0	614.0

H-Filed Strength at 15 cm from the edges surrounding the EUT and 15 cm above the top surface

Spatial Average	Charging Battery Level	Frequency Range (MHz)	Measured H-Field Strength Values (A/m)					FCC H-Field Strength 50% Limits (A/m)	FCC H-Field Strength Limits (A/m)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E		
H_{AVG}	1%	0.136	0.336	0.373	0.316	0.318	0.434	0.815	1.63
	50%	0.136	0.274	0.308	0.228	0.262	0.398	0.815	1.63
	99%	0.136	0.204	0.261	0.199	0.213	0.287	0.815	1.63

H-Field Strength at 20cm from the top surface of the EUT

Charge Port	Charging Battery Level	Frequency Range (MHz)	Measured H-Field Strength Values (A/m)	FCC H-Field Strength 50% Limits (A/m)	FCC H-Field Strength Limits (A/m)
			Test Position E		
H_{AVG}	1%	0.136	0.367	0.815	1.63
	50%	0.136	0.306	0.815	1.63
	99%	0.136	0.240	0.815	1.63

For portable exposure

E-Field Strength at 0 from the edges surrounding the EUT

Test port	Charging Battery Level	Frequency Range (MHz)	Measured E-Field Strength Values (V/m)						FCC E-Field Strength Limits (V/m)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F	
E _{AVG}	1%	0.136	8.635	8.085	8.230	9.635	8.485	8.635	614.0
	50%	0.136	7.940	7.195	7.610	8.920	7.885	7.940	614.0
	99%	0.136	7.420	7.200	7.460	8.380	7.655	7.420	614.0

H-Field Strength at 0 cm from the edges surrounding the EUT

Test port	Charging Battery Level	Frequency Range (MHz)	Measured E-Field Strength Values (A/m)						FCC H-Field Strength Limits (A/m)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F	
H _{AVG}	1%	0.136	0.844	0.851	0.758	0.756	1.004	0.816	1.63
	50%	0.136	0.854	0.871	0.736	0.772	1.039	0.822	1.63
	99%	0.136	0.704	0.756	0.657	0.678	0.874	0.693	1.63

11 Conclusion

A minimum safety distance of 20 cm to the antenna is required when the device is charging a smart phone for mobile exposure. The detected emissions are below the limitations according FCC KDB 680106 and confirmed by the FCC according to KDB Inquire.

12 Test Set-up Photo





-----End-----