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## RF Exposure Evaluation

FCC ID: 2AY5D-CW120

### 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 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.
- (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 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.

### 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 <sup>2</sup> )	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 <sup>2</sup> )	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 <sup>2</sup> )	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).

The diagram illustrates a probe measurement setup. A rectangular workpiece, labeled 'EUT', is positioned on a surface. A coordinate system is defined with 'Rear' at the top, 'Front' at the bottom, 'Left' on the left, and 'Right' on the right. A vertical double-headed arrow labeled 'C' indicates a distance of '20 cm Top' from the 'Rear' face to the top edge. A horizontal double-headed arrow labeled 'E' indicates the width of the workpiece. A horizontal arrow labeled 'A' points from the 'Left' towards the workpiece. A horizontal arrow labeled 'B' points from the workpiece towards the 'Right'. A vertical double-headed arrow labeled 'D' indicates a distance of '15 cm' from the 'Front' face to the bottom edge. A probe, labeled 'Probe', is shown on the right, with a circular tip pointing towards the workpiece. The probe has a rectangular display screen and two small square buttons.

- 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 D01v03.

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

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

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and while those coils are simultaneously energized, are demonstrated to be less than 50% of the applicable MPE limit.		the MPE limit.
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## 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 (12V/1.66A) + EUT + Battery Load (Battery Status: <1%)	Record
Mode 2	AC/DC Adapter (12V/1.66A) + EUT + Battery Load (Battery Status: <50%)	Record
Mode 3	AC/DC Adapter (12V/1.66A) + EUT + Battery Load (Battery Status: 100%)	Record
Mode 4	AC/DC Adapter (9V/2.2A) + EUT + Battery Load (Battery Status: <1%)	Pre-tested
Mode 5	AC/DC Adapter (9V/2.2A) + EUT + Battery Load (Battery Status: <50%)	Pre-tested
Mode 6	AC/DC Adapter (9V/2.2A) + EUT + Battery Load (Battery Status: 100%)	Pre-tested
Mode 7	AC/DC Adapter (5V/3A) + EUT + Battery Load (Battery Status: <1%)	Pre-tested
Mode 8	AC/DC Adapter (5V/3A) + EUT + Battery Load (Battery Status: <50%)	Pre-tested
Mode 9	AC/DC Adapter (5V/3A) + EUT + Battery Load (Battery Status: 100%)	Pre-tested
Note: All test modes were pre-tested, but we only recorded the worst case in this report.		

## 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	/	HNT-PD2001	/	SDOC	Manufacturer

## 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 27 2022	June 26 2023
Magnetic field probe 100cm <sup>2</sup>	Narda	ELT probe 100cm <sup>2</sup>	M0675	June 27 2022	June 26 2023

## 9 Test Result

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

Chargin g Battery Level	Unit	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		
1%	uT	0.144	0.376	0.373	0.381	0.369	0.370	--	--
1%	A/m	0.144	0.301	0.298	0.305	0.295	0.296	0.815	1.63
50%	uT	0.144	0.258	0.255	0.254	0.261	0.260	--	--
50%	A/m	0.144	0.206	0.204	0.203	0.209	0.208	0.815	1.63
99%	uT	0.144	0.190	0.186	0.204	0.185	0.174	--	--
99%	A/m	0.144	0.152	0.149	0.163	0.148	0.139	0.815	1.63

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

Chargin g Battery Level	Unit	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		
1%	V/m	0.144	113.477	112.346	114.985	111.215	111.592	307.0	614.0
50%	V/m	0.144	77.662	76.908	76.531	78.793	78.416	307.0	614.0
99%	V/m	0.144	57.304	56.173	61.451	55.796	52.403	307.0	614.0

Note: V/m= A/m \*377

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H-Field Strength at 20cm from the top surface of the EUT					
Charging Battery Level	Unit	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		
1%	uT	0.144	0.304	--	--
1%	A/m	0.144	0.243	0.815	1.63
50%	uT	0.144	0.195	--	--
50%	A/m	0.144	0.156	0.815	1.63
99%	uT	0.144	0.123	--	--
99%	A/m	0.144	0.098	0.815	1.63

Note:A/m=uT/1.25

## 10 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.

## 11 Test Set-up Photo



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