

1 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 Standard Applicable

According to §1.1307(b)(1) and , systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to §1.1310 and §2.1093 RF exposure is calculated.

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

FCC KDB 680106 D01 RF Exposure Wireless Charging App v03

1.2 Limits for Maximum Permissive Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength(E) (V/m)	Magnetic Field Strength(H) (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational / Controlled Exposure				
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
1500-15000	/	/	5	6
Frequency Range (MHz)	Electric Field Strength(E) (V/m)	Magnetic Field Strength(H) (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
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
1500-15000	/	/	1.0	30

F = frequency in MHz

* = Plane-wave equipment power density

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1.3 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model /Type No.	Series No.	Data Cable	Power Cord
1.	NA	---	---	---	---	---

1.4 The Worst Charging Condition:

Ancillary Equipment	Charging Condition	Verdict
Load	Full Loading	PASS
Load	99% Loading	PASS
Load	90% Loading	PASS
Load	50% Loading	PASS
Load	10% Loading	PASS
Load	1% Loading	PASS
Note: For Wireless Power Consortium Qi specification, a lower operating frequency or high duty cycle result in the transfer of a higher amount of power and charging current.		

1.5 Measurement Procedure:

- For devices designed for typical desktop applications, such a wireless charging pads, RF exposure evaluation should be conducted assuming a user separation distance of 10 cm, 15 cm and 20 cm. E and H field strength measurements or numerical modeling may be used to demonstrate compliance. Measurements should be made from all sides and the top of the primary/client pair, with the 10 cm, 15 cm and 20 cm measured from the center of the probe(s) to the edge of the device. Emissions between 100 kHz to 300 kHz should be assessed versus the limits at 300 kHz in Table 1 of Section 1.1310: 614 V/m and 1.63 A/m.

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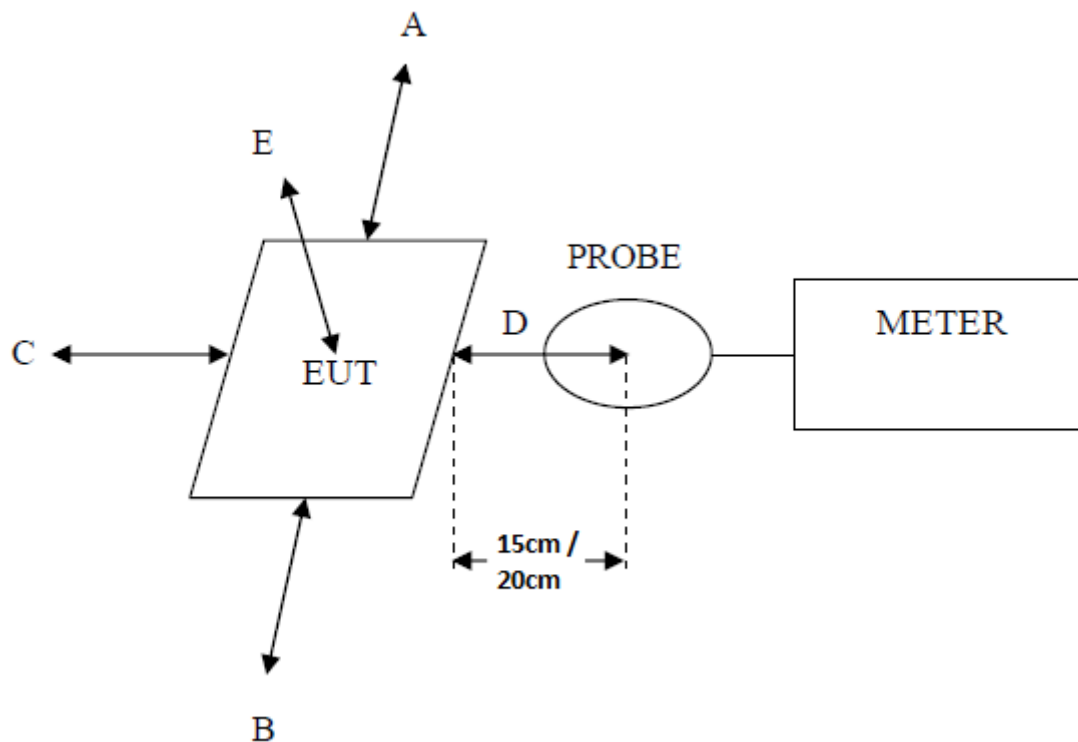
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1.6 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EM RADIATION METER	Wandel & Goltermann	EMR-30	M-0006	10/12/2018	10/11/2019

1.7 Test Set-up:



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1.8 Maximum Permissible Exposure (MPE) Evaluation:

Full Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	10 cm	3.6	0.0068
Back	10 cm	2.5	0.0065
Left	10 cm	3.14	0.0054
Right	10 cm	2.71	0.0084
Top	10 cm	4.24	0.0112
Bottom	10 cm	4.1	0.0111
Limit		614	0.815

99% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	10 cm	3.59	0.0086
Back	10 cm	3.19	0.004
Left	10 cm	3.13	0.0058
Right	10 cm	2.75	0.0072
Top	10 cm	4.29	0.0121
Bottom	10 cm	4.1	0.0125
Limit		614	0.815

90% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	10 cm	3.61	0.005
Back	10 cm	3.2	0.0034
Left	10 cm	3.13	0.0042
Right	10 cm	2.68	0.0068
Top	10 cm	4.22	0.0118
Bottom	10 cm	4.08	0.0111
Limit		614	0.815

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50% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	10 cm	3.59	0.0072
Back	10 cm	3.14	0.0062
Left	10 cm	3.04	0.0036
Right	10 cm	2.62	0.0076
Top	10 cm	4.32	0.013
Bottom	10 cm	4.12	0.0125
Limit		614	0.815

10% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	10 cm	3.54	0.005
Back	10 cm	3.21	0.0062
Left	10 cm	3.23	0.0061
Right	10 cm	2.74	0.0076
Top	10 cm	4.16	0.0108
Bottom	10 cm	4.07	0.0121
Limit		614	0.815

1% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	10 cm	3.65	0.0066
Back	10 cm	3.09	0.0044
Left	10 cm	3.1	0.0034
Right	10 cm	2.65	0.0072
Top	10 cm	4.23	0.0098
Bottom	10 cm	4.14	0.0093
Limit		614	0.815

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Full Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	15 cm	2.29	0.003
Back	15 cm	1.82	0.0044
Left	15 cm	1.69	0.0034
Right	15 cm	1.53	0.006
Top	15 cm	2.81	0.0082
Bottom	15 cm	2.66	0.0095
Limit		614	0.815

99% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	15 cm	2.39	0.002
Back	15 cm	1.67	0.0032
Left	15 cm	1.66	0.003
Right	15 cm	1.53	0.005
Top	15 cm	2.93	0.012
Bottom	15 cm	2.71	0.0105
Limit		614	0.815

90% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	15 cm	2.23	0.0036
Back	15 cm	1.65	0.003
Left	15 cm	1.8	0.0042
Right	15 cm	1.5	0.0066
Top	15 cm	2.85	0.0093
Bottom	15 cm	2.69	0.0109
Limit		614	0.815

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50% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	15 cm	2.33	0.0031
Back	15 cm	1.81	0.0056
Left	15 cm	1.64	0.0016
Right	15 cm	1.45	0.0032
Top	15 cm	2.94	0.0096
Bottom	15 cm	2.72	0.0103
Limit		614	0.815

10% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	15 cm	2.4	0.0038
Back	15 cm	1.64	0.0052
Left	15 cm	1.8	0.0054
Right	15 cm	1.45	0.0048
Top	15 cm	2.91	0.009
Bottom	15 cm	2.61	0.0093
Limit		614	0.815

1% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	15 cm	2.22	0.0042
Back	15 cm	1.73	0.0042
Left	15 cm	1.81	0.0028
Right	15 cm	1.5	0.0038
Top	15 cm	2.8	0.0092
Bottom	15 cm	2.58	0.0084
Limit		614	0.815

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Full Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	20 cm	0.84	0.0024
Back	20 cm	0.35	0.0024
Left	20 cm	0.43	0.001
Right	20 cm	0.12	0.002
Top	20 cm	1.42	0.0074
Bottom	20 cm	1.2	0.0061
Limit		614	0.815

99% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	20 cm	0.92	0.0004
Back	20 cm	0.36	0.0008
Left	20 cm	0.34	0.0012
Right	20 cm	0.1	0.0012
Top	20 cm	1.35	0.0062
Bottom	20 cm	1.3	0.0073
Limit		614	0.815

90% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	20 cm	0.83	0.003
Back	20 cm	0.35	0.0002
Left	20 cm	0.41	0.001
Right	20 cm	0.16	0.0018
Top	20 cm	1.44	0.009
Bottom	20 cm	1.25	0.0057
Limit		614	0.815

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50% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	20 cm	0.8	0.0028
Back	20 cm	0.39	0.0022
Left	20 cm	0.36	0.001
Right	20 cm	0.15	0.0006
Top	20 cm	1.47	0.0054
Bottom	20 cm	1.11	0.0065
Limit		614	0.815

10% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	20 cm	0.8	0.0036
Back	20 cm	0.35	0.0024
Left	20 cm	0.34	0.0012
Right	20 cm	0.12	0.0012
Top	20 cm	1.49	0.0088
Bottom	20 cm	1.12	0.0047
Limit		614	0.815

1% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	20 cm	0.84	0.0012
Back	20 cm	0.48	0.0018
Left	20 cm	0.48	0.0018
Right	20 cm	0.08	0.002
Top	20 cm	1.38	0.0064
Bottom	20 cm	1.16	0.0081
Limit		614	0.815

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