

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.	Adapter	SAMSUNG	ETA-U90JWS	RT4D402KS/B	---	---
2.	IPHONE	IPHONE	A1897	FDGVPCXDJCM4	---	---

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:

1. 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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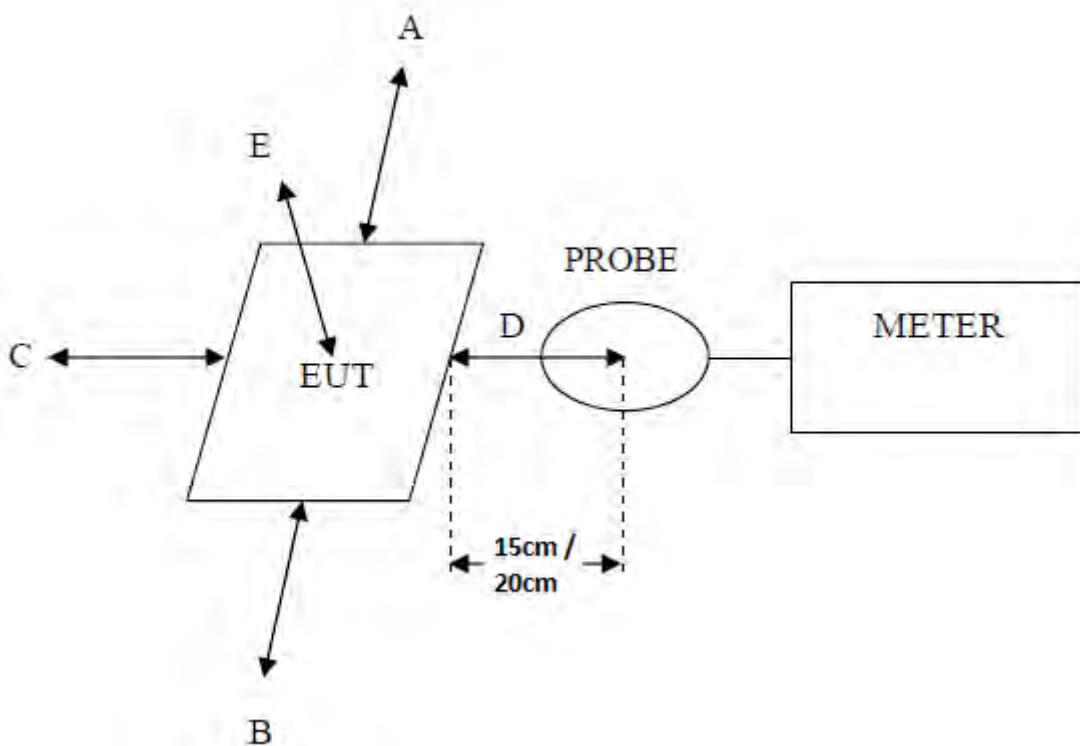
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1.6 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
BROADBAND FIELD METER	NARDA	NBM-520	D-0924	10/26/2018	10/26/2019

1.7 Test Set-up:



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1.8 Maximum Permissible Exposure (MPE) Evaluation:

Ambient temperature: 20.9 Relative humidity: 56% Test Date: 2019/06/24

Full Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	10 cm	0.45	0.015
Back	10 cm	0.86	0.023
Left	10 cm	1	0.027
Right	10 cm	1.07	0.026
Top	10 cm	1.51	0.051
Bottom	10 cm	0.86	0.026
Limit		614	0.815

99% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	10 cm	0.44	0.0162
Back	10 cm	1.09	0.0264
Left	10 cm	0.94	0.0258
Right	10 cm	1.02	0.024
Top	10 cm	1.45	0.052
Bottom	10 cm	0.94	0.0252
Limit		614	0.815

90% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	10 cm	0.4	0.0156
Back	10 cm	1.07	0.0288
Left	10 cm	1.06	0.0266
Right	10 cm	0.97	0.0254
Top	10 cm	1.6	0.052
Bottom	10 cm	0.89	0.0268
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	0.44	0.016
Back	10 cm	1.01	0.0278
Left	10 cm	1.08	0.0284
Right	10 cm	1.06	0.0272
Top	10 cm	1.54	0.0498
Bottom	10 cm	0.94	0.0268
Limit		614	0.815

10% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	10 cm	0.51	0.0166
Back	10 cm	1.02	0.0254
Left	10 cm	1	0.029
Right	10 cm	1.02	0.027
Top	10 cm	1.58	0.053
Bottom	10 cm	0.85	0.0248
Limit		614	0.815

1% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	10 cm	0.48	0.015
Back	10 cm	1.04	0.0274
Left	10 cm	1.04	0.0262
Right	10 cm	1.05	0.0244
Top	10 cm	1.41	0.0528
Bottom	10 cm	0.94	0.027
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	0.35	0.011
Back	15 cm	0.49	0.015
Left	15 cm	0.61	0.016
Right	15 cm	0.56	0.016
Top	15 cm	1.01	0.028
Bottom	15 cm	0.56	0.016
Limit		614	0.815

99% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	15 cm	0.27	0.0122
Back	15 cm	0.57	0.0156
Left	15 cm	0.58	0.0146
Right	15 cm	0.46	0.0148
Top	15 cm	0.92	0.027
Bottom	15 cm	0.59	0.0152
Limit		614	0.815

90% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	15 cm	0.39	0.0124
Back	15 cm	0.61	0.0166
Left	15 cm	0.6	0.0162
Right	15 cm	0.55	0.0164
Top	15 cm	1.01	0.0292
Bottom	15 cm	0.61	0.014
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	0.27	0.0104
Back	15 cm	0.55	0.015
Left	15 cm	0.54	0.0152
Right	15 cm	0.66	0.0156
Top	15 cm	0.95	0.0288
Bottom	15 cm	0.5	0.0164
Limit		614	0.815

10% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	15 cm	0.33	0.0106
Back	15 cm	0.51	0.0162
Left	15 cm	0.58	0.0146
Right	15 cm	0.55	0.0162
Top	15 cm	0.93	0.0268
Bottom	15 cm	0.62	0.0166
Limit		614	0.815

1% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	15 cm	0.4	0.01
Back	15 cm	0.68	0.0142
Left	15 cm	0.7	0.015
Right	15 cm	0.52	0.0174
Top	15 cm	1.11	0.03
Bottom	15 cm	0.48	0.0162
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	0.2	0.008
Back	20 cm	0.35	0.009
Left	20 cm	0.47	0.011
Right	20 cm	0.43	0.013
Top	20 cm	0.71	0.02
Bottom	20 cm	0.41	0.009
Limit		614	0.815

99% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	20 cm	0.2	0.01
Back	20 cm	0.5	0.0104
Left	20 cm	0.46	0.0108
Right	20 cm	0.42	0.0118
Top	20 cm	0.77	0.0202
Bottom	20 cm	0.41	0.0076
Limit		614	0.815

90% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	20 cm	0.37	0.0082
Back	20 cm	0.53	0.0098
Left	20 cm	0.38	0.0128
Right	20 cm	0.5	0.0132
Top	20 cm	0.63	0.021
Bottom	20 cm	0.44	0.009
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	0.26	0.0078
Back	20 cm	0.39	0.009
Left	20 cm	0.47	0.0118
Right	20 cm	0.43	0.0132
Top	20 cm	0.64	0.022
Bottom	20 cm	0.5	0.0098
Limit		614	0.815

10% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	20 cm	0.25	0.0066
Back	20 cm	0.4	0.0104
Left	20 cm	0.48	0.0106
Right	20 cm	0.46	0.0118
Top	20 cm	0.61	0.0188
Bottom	20 cm	0.35	0.0108
Limit		614	0.815

1% Loading

Maximum Permissible Exposure			
Probe from EUT Side	Test Distance	V/m	A/m
Front	20 cm	0.35	0.0086
Back	20 cm	0.42	0.0106
Left	20 cm	0.48	0.0116
Right	20 cm	0.44	0.0128
Top	20 cm	0.64	0.0194
Bottom	20 cm	0.45	0.008
Limit		614	0.815

~End of Report~

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