

1.Measuring Standard

FCC Part 1(1.1310) and Part 2(2.1091), KDB 680106 D01v03r01 RF Exposure Wireless Charging App v03

1.2. Requirements

Three different categories of transmitters are defined by the FCC in OET Bulletin 65. These categories are fixed installation, mobile, and portable and are defined as follows:

- o Fixed Installations: fixed location means that the device, including its antenna, is physically secured at a permanent location and is not able to be easily moved to another location. Additionally, distance to humans from the antenna is maintained to at least 2 meters.
- o Mobile Devices: a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to be generally used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structures and the body of the user or nearby persons. Transmitters designed to be used by consumers or workers that can be easily re-located, such as a wireless modem operating in a laptop computer, are considered mobile devices if they meet the 20 centimeter separation requirement. The FCC rules for evaluating mobile devices for RF compliance are found in 47 CFR §2.1091.
- o Portable Devices: a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user. Portable device requirements are found in Section 2.1093 of the FCC's Rules (47 CFR§2.1093). The FCC also categorizes the use of the device as based upon the user's awareness and ability to exercise control over his or her exposure.

The two categories defined are Occupational/ Controlled Exposure and General Population/Uncontrolled Exposure. These two categories are defined as follows:

Occupational/Controlled Exposure: In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means. Awareness of the potential for RF exposure in a workplace or similar environment can be provided through specific training as part of a RF safety program. If appropriate, warning signs and labels can also be used to establish such awareness by providing prominent information on the risk of potential exposure and instructions on methods to minimize such exposure risks.

General Population/Uncontrolled Exposure: The general population / uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

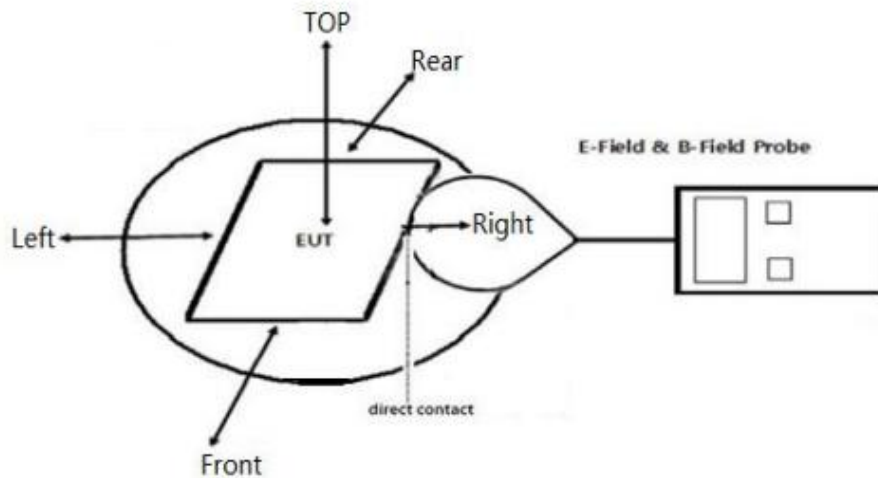
1.3 Test Procedure

Test Procedure

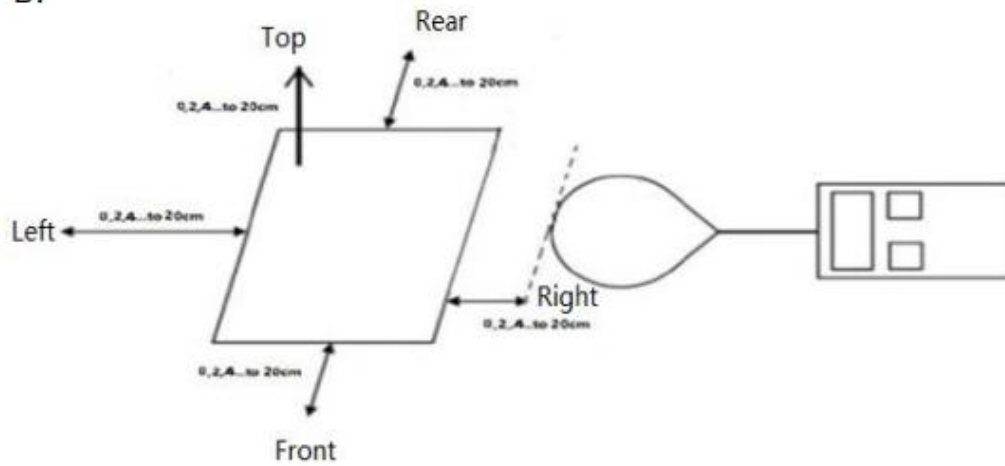
- 1) RF exposure test was performed in anechoic chamber.
- 2) The measurement probe was placed at 0 cm surrounding the device for test setup A; and the measurement Probe was placed from 0 cm to 20 cm, in 2 cm maximum increment measured from the edge of the device For the test setup B.
- 3) The highest emission level was recorded and compared with limit as soon as measurement of eachd) The highest emission level was recorded and compared with limit as soon as measurement of each points (left, right, front, rear and top) were completed.
- 4) The EUT was measured according to the dictates of KDB680106 D01
- 5) Remark: The EUT's test position left, right, front, rear and top is valid for the E and H field measurements.

1.4 Block Diagram Of Test Setup

A:



B:



2. Limits

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 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
300-1,500			f/300	6
1,500-100,000			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
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

3. MEASURING DEVICE AND TEST EQUIPMENT

2.1 For MPE Measurement

Equipment	Manufacturer	Model No.	Serial No.	Last calibration	Calibrated until	Cal. Interval
E-Field Probe(100kHz-3GHz)	Narda	EF0391	Q15221	Mar 29, 2022	Mar 28, 2023	1 Year
H-Field Probe(300KHz-30MHz)	Narda	HF3061	Q15835	Mar 29, 2022	Mar 28, 2023	1 Year
Broadband Field Meter	Narda	NBM-550	Q201455	Mar 29, 2022	Mar 28, 2023	1 Year
Load	Apple	iPhone 8 Plus	N/A	N/A	N/A	N/A

4. Measuring Results

EUT:	Magnetic wireless POWER BANK	Model Name. :	IMWP100M
Temperature:	24 °C	Relative Humidity:	56%
Pressure:	1010hPa	Test Date:	2022-08-12
Test Voltage:	DC 3.7V from battery		

H-Filed Strength at 0 cm from edges surrounding the EUT (A/m)

Operation condition	Test Position Front (A/m)	Test Position Rear (A/m)	Test Position Left (A/m)	Test Position Right (A/m)	Test Position Top (A/m)	Limits (A/m)
Full load	0.205	0.183	0.207	0.198	0.189	1.63
Half load	0.191	0.157	0.199	0.187	0.187	1.63
No load	0.193	0.136	0.189	0.182	0.179	1.63

E-Field Strength at 0 cm from edges surrounding the EUT (V/m)

Operation condition	Test Position Front (V/m)	Test Position Rear (V/m)	Test Position Left (V/m)	Test Position Right (V/m)	Test Position Top (V/m)	Limits (V/m)
Full load	0.205	0.183	0.207	0.198	0.189	614
Half load	0.191	0.157	0.199	0.187	0.187	614
No load	0.193	0.136	0.189	0.182	0.179	614

E-Field Strength at (distance from 0cm to 20cm at 2cm iteration) surrounding the EUT (A/m)
Full load:

Test distance (cm)	Test Position Front (A/m)	Test Position Rear (A/m)	Test Position Left (A/m)	Test Position Right (A/m)	Test Position Top (A/m)	Limits (A/m)
0	0.213	0.198	0.213	0.192	0.186	1.63
2	0.192	0.193	0.185	0.186	0.187	1.63
4	0.175	0.183	0.184	0.182	0.211	1.63
6	0.173	0.175	0.181	0.183	0.194	1.63
8	0.189	0.191	0.192	0.188	0.185	1.63
10	0.179	0.176	0.175	0.183	0.187	1.63
12	0.181	0.182	0.183	0.188	0.189	1.63
14	0.178	0.177	0.179	0.175	0.173	1.63
16	0.185	0.186	0.183	0.201	0.193	1.63
18	0.187	0.195	0.193	0.194	0.188	1.63
20	0.193	0.195	0.194	0.199	0.198	1.63

E-Field Strength at (distance from 0cm to 20cm at 2cm iteration) surrounding the EUT (V/m)

Test distance (cm)	Test Position Front (V/m)	Test Position Rear (V/m)	Test Position Left (V/m)	Test Position Right (V/m)	Test Position Top (V/m)	Limits (V/m)
0	0.202	0.192	0.213	0.192	0.184	614
2	0.211	0.196	0.203	0.192	0.186	614

4	0.213	0.197	0.212	0.213	0.186	614
6	0.198	0.195	0.193	0.194	0.197	614
8	0.185	0.182	0.179	0.175	0.185	614
10	0.201	0.205	0.193	0.198	0.195	614
12	0.192	0.188	0.193	0.195	0.194	614
14	0.179	0.181	0.177	0.189	0.188	614
16	0.185	0.184	0.183	0.188	0.191	614
18	0.177	0.175	0.173	0.178	0.179	614
20	0.171	0.185	0.173	0.177	0.179	614

E-Field Strength at (distance from 0cm to 20cm at 2cm iteration) surrounding the EUT (A/m)
Half load:

Test distance (cm)	Test Position Front (A/m)	Test Position Rear (A/m)	Test Position Left (A/m)	Test Position Right (A/m)	Test Position Top (A/m)	Limits (A/m)
0	0.202	0.188	0.199	0.193	0.181	1.63
2	0.196	0.195	0.195	0.186	0.187	1.63
4	0.175	0.183	0.184	0.182	0.211	1.63
6	0.199	0.195	0.193	0.185	0.187	1.63
8	0.181	0.182	0.185	0.178	0.191	1.63
10	0.183	0.175	0.176	0.174	0.188	1.63
12	0.202	0.203	0.193	0.185	0.177	1.63
14	0.193	0.198	0.182	0.176	0.179	1.63
16	0.181	0.179	0.177	0.179	0.177	1.63
18	0.185	0.183	0.177	0.176	0.182	1.63
20	0.183	0.185	0.179	0.176	0.192	1.63

E-Field Strength at (distance from 0cm to 20cm at 2cm iteration) surrounding the EUT (V/m)

Test distance (cm)	Test Position Front (V/m)	Test Position Rear (V/m)	Test Position Left (V/m)	Test Position Right (V/m)	Test Position Top (V/m)	Limits (V/m)
0	0.211	0.199	0.213	0.192	0.184	614
2	0.215	0.199	0.203	0.192	0.186	614
4	0.208	0.201	0.212	0.213	0.186	614
6	0.193	0.192	0.185	0.188	0.189	614
8	0.185	0.199	0.193	0.198	0.197	614
10	0.211	0.203	0.198	0.199	0.188	614
12	0.176	0.183	0.192	0.188	0.185	614
14	0.181	0.179	0.183	0.185	0.183	614
16	0.191	0.193	0.195	0.185	0.183	614
18	0.188	0.182	0.178	0.179	0.181	614
20	0.173	0.175	0.177	0.176	0.173	614

E-Field Strength at (distance from 0cm to 20cm at 2cm iteration) surrounding the EUT (A/m)
No load:

Test distance (cm)	Test Position Front (A/m)	Test Position Rear (A/m)	Test Position Left (A/m)	Test Position Right (A/m)	Test Position Top (A/m)	Limits (A/m)
0	0.213	0.198	0.213	0.192	0.186	1.63
2	0.192	0.193	0.185	0.186	0.187	1.63
4	0.175	0.183	0.184	0.182	0.211	1.63
6	0.179	0.185	0.178	0.177	0.172	1.63
8	0.202	0.201	0.188	0.198	0.195	1.63
10	0.185	0.183	0.181	0.182	0.188	1.63
12	0.183	0.178	0.191	0.176	0.178	1.63
14	0.193	0.198	0.185	0.183	0.182	1.63
16	0.184	0.185	0.183	0.184	0.188	1.63
18	0.175	0.174	0.175	0.177	0.178	1.63
20	0.181	0.180	0.183	0.182	0.189	1.63

E-Field Strength at (distance from 0cm to 20cm at 2cm iteration) surrounding the EUT (V/m)

Test distance (cm)	Test Position Front (V/m)	Test Position Rear (V/m)	Test Position Left (V/m)	Test Position Right (V/m)	Test Position Top (V/m)	Limits (V/m)
0	0.195	0.199	0.213	0.192	0.181	614
2	0.188	0.195	0.202	0.193	0.187	614
4	0.202	0.201	0.212	0.213	0.182	614
6	0.193	0.192	0.193	0.183	0.185	614
8	0.189	0.182	0.178	0.176	0.177	614
10	0.209	0.193	0.189	0.188	0.179	614
12	0.182	0.177	0.175	0.173	0.179	614
14	0.193	0.183	0.182	0.188	0.183	614
16	0.176	0.181	0.179	0.176	0.177	614
18	0.189	0.183	0.178	0.183	0.174	614
20	0.173	0.179	0.175	0.172	0.170	614

Remark: According KDB 680106 D01v03r01 RF Exposure Wireless Charging App v03r01, section 5, b). 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. The E- field evaluation conducted assuming a user separation distance of 15 cm according to the KDB 680106 D01v03r01 RF Exposure Wireless Charging App v03 r01 section 3, c).

Note: The EUT supports one voltage input and output. The EUT performs one voltage mode pretests.

Result: The device comply with the RF exposure requirement according to 680106 D01v03r01, section 5, b):

- (1) The operating frequency is 111kHz~175kHz, is less than 1MHz.
- (2) The max Output power for coil is 10W.
- (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) The EUT is a portable device.
- (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.



Signature:

Date:2022-08-12

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