

1. Measuring Standard

FCC Part 1(1.1310) and Part 2(2.1091)

1.2. Requirements

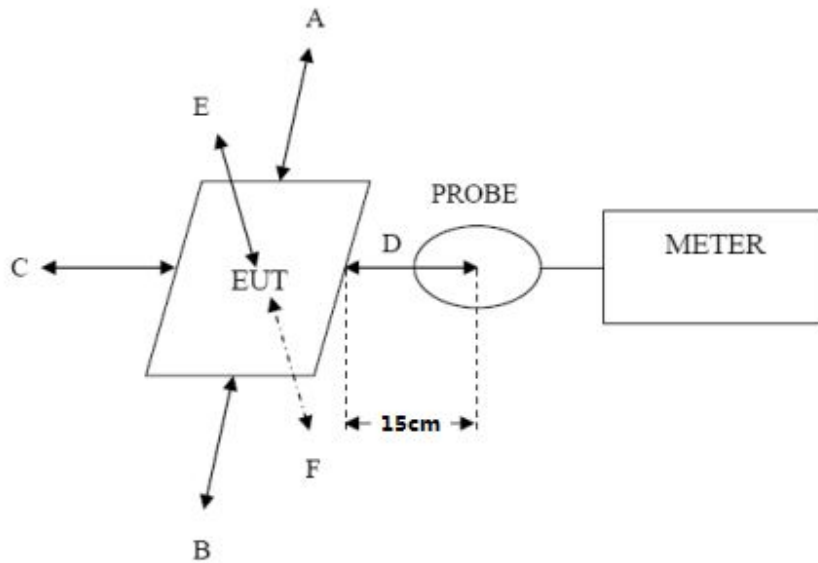
Three different categories of transmitters are defined by the FCC in OET Bulletin 65. These categories are fixed installation, mobile, and portable and are defined as follows:

- 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 configuration

- 1, The field strength of both E-field and H-field was measured at 15cm using the equipment list above for determining compliance with the MPE requirements of FCC Part 1.1310.
- 2, The RF power density was measured at under maximum load test
- 3, Maximum E-field and H-field measurements were made 15cm from each side of the EUT. Along the side of the EUT and still 15cm away from the edge of the EUT, the field probes were positioned at the location where there is maximum field strength. The maximum E-field and H-field is reported below.
- 4, this device uses a wireless charging circuit for power transfer operating at the frequency of 110-205 kHz. Thus, the 300 kHz limits were used: E-field Limit = 614 (V/m); H-field limit = 1.63 (A/m).

1.4 Test Setup



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 Cal.	Cal. Interval
E-Field Probe(100kHz-3GHz)	Narda	EF0391	Q15221	May 16, 2019	1 Year
H-Field Probe(300KHz-30MHz)	Narda	HF3061	Q15835	May 16, 2019	1 Year
Broadband Field Meter Adapter	Narda	NBM-550	Q201455	May 16, 2019	1 Year
	N/A	SAW30-120-2500U	N/A	N/A	N/A
Load	N/A	N/A	N/A	N/A	N/A

4. Measuring Results

EUT:	Car Wireless Charger	Model Name. :	HFC-1002
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Test Date:	2019-04-01
Test Voltage:	Input: DC 12V form battery. Output: DC 5V/2A		
Test Mode :	High frequency/Max Load		

Table 1. E-Field MPE

E-Field Measurement (15cm)						
EUT Side	Left(V/m)	Right(V/m)	Top(V/m)	Bottom (V/m)	Z-Axis(above) (V/m)	Limits (V/m)
Max load	2.16	2.06	1.83	1.78	1.22	614

Table 2. H-Field MPE Data

H-Field Measurement (15cm)						
EUT Side	Left(A/m)	Right(A/m)	Top(A/m)	Bottom (A/m)	Z-Axis(above) (A/m)	Limits (A/m)
Max load	0.015	0.027	0.033	0.047	0.084	1.63

Remark: The device meets the mobile RF exposure limit at a 15cm separation distance as specified in §2.1091 of the FCC Rules. The maximum leakage fields at 15 cm surrounding the device from all simultaneous transmitting coils are demonstrated to be less than 30% of the MPE limit.

Note: The EUT supports two voltage inputs and outputs. The EUT performs two voltage mode pretests. Only the worst case of the two voltage modes is recorded in the report.

EUT:	Car Wireless Charger	Model Name. :	HFC-1002
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Test Date:	2019-04-01
Test Voltage:	Input: DC 24V from battery. Output: DC 9V/1A		
Test Mode :	High frequency/Max Load		

Table 1. E-Field MPE
E-Field Measurement (15cm)

EUT Side	Left(V/m)	Right(V/m)	Top(V/m)	Bottom (V/m)	Z-Axis(above) (V/m)	Limits (V/m)
Max load	2.12	3.54	2.45	2.21	2.16	614

Table 2. H-Field MPE Data

H-Field Measurement (15cm)						
EUT Side	Left(A/m)	Right(A/m)	Top(A/m)	Bottom (A/m)	Z-Axis(above) (A/m)	Limits (A/m)
Max load	0.083	0.077	0.091	0.012	0.072	1.63

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Test Voltage:	Input: DC 12V form battery. Output: DC 5V/2A		
Test Mode :	High frequency/Half Load		

Table 1. E-Field MPE

E-Field Measurement (15cm)						
EUT Side	Left(V/m)	Right(V/m)	Top(V/m)	Bottom (V/m)	Z-Axis(above) (V/m)	Limits (V/m)
Max load	1.89	1.54	1.32	1.22	1.01	614

Table 2. H-Field MPE Data

H-Field Measurement (15cm)						
EUT Side	Left(A/m)	Right(A/m)	Top(A/m)	Bottom (A/m)	Z-Axis(above) (A/m)	Limits (A/m)
Max load	0.011	0.021	0.023	0.038	0.044	1.63

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Table 1. E-Field MPE
E-Field Measurement (15cm)

EUT Side	Left(V/m)	Right(V/m)	Top(V/m)	Bottom (V/m)	Z-Axis(above) (V/m)	Limits (V/m)
Max load	1.78	2.87	2.05	2.11	2.13	614

Table 2. H-Field MPE Data

H-Field Measurement (15cm)						
EUT Side	Left(A/m)	Right(A/m)	Top(A/m)	Bottom (A/m)	Z-Axis(above) (A/m)	Limits (A/m)
Max load	0.013	0.037	0.041	0.002	0.042	1.63

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Pressure:	1010hPa	Test Date:	2019-04-01
Test Voltage:	Input: DC 12V form battery. Output: DC 5V/2A		
Test Mode :	High frequency/No Load		

Table 1. E-Field MPE
E-Field Measurement (15cm)

EUT Side	Left(V/m)	Right(V/m)	Top(V/m)	Bottom (V/m)	Z-Axis(above) (V/m)	Limits (V/m)
Max load	1.08	1.06	0.96	1.08	0.97	614

Table 2. H-Field MPE Data

H-Field Measurement (15cm)						
EUT Side	Left(A/m)	Right(A/m)	Top(A/m)	Bottom (A/m)	Z-Axis(above) (A/m)	Limits (A/m)
Max load	0.002	0.008	0.013	0.027	0.014	1.63

Remark: The device meets the mobile RF exposure limit at a 15cm separation distance as specified in §2.1091 of the FCC Rules. The maximum leakage fields at 15cm surrounding the device from all simultaneous transmitting coils are demonstrated to be less than 30% of the MPE limit.

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E-Field Measurement (15cm)

EUT Side	Left(V/m)	Right(V/m)	Top(V/m)	Bottom (V/m)	Z-Axis(above) (V/m)	Limits (V/m)
Max load	1.14	1.23	1.21	1.01	1.08	614

Table 2. H-Field MPE Data

H-Field Measurement (15cm)						
EUT Side	Left(A/m)	Right(A/m)	Top(A/m)	Bottom (A/m)	Z-Axis(above) (A/m)	Limits (A/m)
Max load	0.003	0.017	0.031	0.002	0.032	1.63

Remark: The device meets the mobile RF exposure limit at a 15cm separation distance as specified in §2.1091 of the FCC Rules. The maximum leakage fields at 15cm surrounding the device from all simultaneous transmitting coils are demonstrated to be less than 30% of the MPE limit.

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5. Statement Declaration

Items	Requirements	Conclusion	Note
Power transfer frequency	Less than 1 MHz.	Comply	Refer to FCC test report
Output power	Each primary coil is less than or equal to 15 watts.	Comply	Refer to User Manual
Coils	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.	Comply	Single coils(Refer to User Manual)
Place	Client device is placed directly in contact with the transmitter		Refer to User Manual
Mobile exposure conditions only	----	Comply	Mobile Condition Only
H-field strengths	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.	Comply	Refer test report

6. PHOTOGRAPHS OF TEST SETUP

