- RF Exposure

1. Introduction

This document is prepared to show compliance with the RF Exposure requirements as required in §1.1310 of the FCC Rules and Regulations.

The limit for Maximum Permissible Exposure (MPE), specified in FCC §1.1310, is listed in Table 1-1. According to FCC §1.1310: the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b).

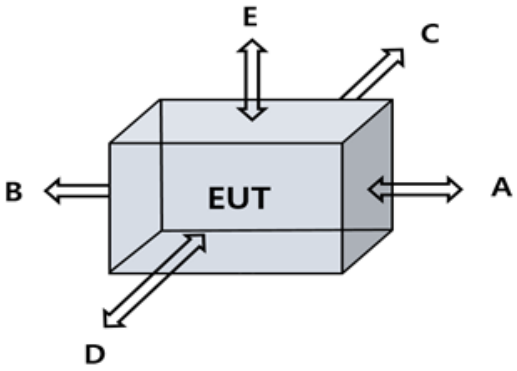
Table 1—Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric field strength (V/m)	Magnetic field Strength (A/m)	Power density (mW/cm2)	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/f2	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/f2	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

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

Per the guidance of KDB 680106, the E-field and H-field limits shown in the table above are extended down to 100kHz.

2. Test Set-up



2.1 Test configurations

In order to check all kinds of possible configurations, EUT was evaluated with appropriate client and under each charging condition as below table.

EUT Mode	Description
5 V Charging Mode with Client device (Model : SM-G930S, FCC ID : A3LSMG930KOR)	Less than 1 % of Battery
	Less than 50 % of Battery
	100 % full charging of Battery
9 V Fast Charging Mode with Client device (Model : SM-G930S, FCC ID : A3LSMG930KOR)	Less than 1 % of Battery
	Less than 50 % of Battery
	100 % full charging of Battery

Note : The above EUT information was declared by the manufacturer.

2.2 Measurement procedure

a) The RF exprosure test was performed on the table in anechoic chamber.
b) The measurement was investigated between the edge of the charger and center of the field probe in the closest state.
c) Maximum E-field and H-field measurements were made on each of five sides of the EUT that could come in contact with a user. Five sides are defined as follows: Right (B), Top (E), Left (A), Rear (D) and Front (C). Refer to the test position diagram above.
d) According to the guidance of KDB 680106 D01 v03 test distance was 15 cm on the surrounding sides from the EUT.
e) Equipment approval considerations item 5.b) of KDB 680106 D01 v03

(1) The device operates at frequency ranges as bleow.
- DC 5 V : 104 ㎑ ~ 175 ㎑
- DC 9 V : 114 ㎑ ~ 162 ㎑

(2) Output power from each primary coil is less than or equal to 15 watts.
- Output power from primary coil : 15 Watts(Max.)

(3) The transfer system 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.
- The transfer system includes only single primary and secondary coils.

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(4) Client device is placed directly in contact with the transmitter.
- Client device is placed directly in contact with the transmitter.

(5) 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.
- Refer to following worst test result (For more detail, please refer to section 3)
1) The worst E-Field Strength levels at 15 cm < 50 % of the MPE E-Field Strength limit 614 V/m
5 V Full Charging 100 % of Battery : 0.781 V/m < 307 V/m
2) The worst H-Field Strength levels at 15 cm < 50 % of the MPE H-Field Strength limit 1.63 A/m
5 V Less than 1 % of Battery : 0.126 A/m < 0.815 A/m

3. Test Result

- Complied

The probe was positioned at the location where there is maximum field strength on each side of the EUT. The maximum E-field and H-field is reported below.

- 5 V Charging Mode (Less than 1 % of Battery)

E-field Measurements

Distance (cm)	Position A (V/m)	Position B (V/m)	Position C (V/m)	Position D (V/m)	Position E (V/m)	Around A to E (V/m)	Limit (V/m)
15	0.642	0.701	0.692	0.599	0.604	0.611	614.00
20					0.601		614.00

H-field Measurements

Distance (cm)	Position A (A/m)	Position B (A/m)	Position C (A/m)	Position D (A/m)	Position E (A/m)	Around A to E (A/m)	Limit (A/m)
15	0.030	0.027	0.028	0.052	0.081	0.086	1.63
20					0.076		1.63

- 5 V Charging Mode (Less than 50 % of Battery)

E-field Measurements

Distance (cm)	Position A (V/m)	Position B (V/m)	Position C (V/m)	Position D (V/m)	Position E (V/m)	Around A to E (V/m)	Limit (V/m)
15	0.651	0.718	0.698	0.602	0.612	0.617	614.00
20					0.610		614.00

H-field Measurements

Distance (cm)	Position A (A/m)	Position B (A/m)	Position C (A/m)	Position D (A/m)	Position E (A/m)	Around A to E (A/m)	Limit (A/m)
15	0.030	0.028	0.029	0.054	0.085	0.090	1.63
20					0.078		1.63

- 5 V Charging Mode (100 % full charging of Battery)

E-field Measurements

Distance (cm)	Position A (V/m)	Position B (V/m)	Position C (V/m)	Position D (V/m)	Position E (V/m)	Around A to E (V/m)	Limit (V/m)
15	0.655	0.719	0.701	0.605	0.614	0.619	614.00
20					0.610		614.00

H-field Measurements

Distance (cm)	Position A (A/m)	Position B (A/m)	Position C (A/m)	Position D (A/m)	Position E (A/m)	Around A to E (A/m)	Limit (A/m)
15	0.029	0.027	0.032	0.056	0.086	0.091	1.63
20					0.081		1.63

Note: The data above show that 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.

- 9 V Charging Mode (Less than 1 % of Battery)

E-field Measurements

Distance (cm)	Position A (V/m)	Position B (V/m)	Position C (V/m)	Position D (V/m)	Position E (V/m)	Around A to E (V/m)	Limit (V/m)
15	0.739	0.728	0.744	0.660	0.771	0.775	614.00
20					0.765		614.00

H-field Measurements

Distance (cm)	Position A (A/m)	Position B (A/m)	Position C (A/m)	Position D (A/m)	Position E (A/m)	Around A to E (A/m)	Limit (A/m)
15	0.041	0.035	0.025	0.036	0.087	0.098	1.63
20					0.085		1.63

- 9 V Charging Mode (Less than 50 % of Battery)

E-field Measurements

Distance (cm)	Position A (V/m)	Position B (V/m)	Position C (V/m)	Position D (V/m)	Position E (V/m)	Around A to E (V/m)	Limit (V/m)
15	0.748	0.729	0.747	0.663	0.774	0.778	614.00
20					0.770		614.00

H-field Measurements

Distance (cm)	Position A (A/m)	Position B (A/m)	Position C (A/m)	Position D (A/m)	Position E (A/m)	Around A to E (A/m)	Limit (A/m)
15	0.044	0.036	0.026	0.039	0.087	0.098	1.63
20					0.086		1.63

- 9 V Charging Mode (100 % full charging of Battery)

E-field Measurements

Distance (cm)	Position A (V/m)	Position B (V/m)	Position C (V/m)	Position D (V/m)	Position E (V/m)	Around A to E (V/m)	Limit (V/m)
15	0.751	0.733	0.752	0.681	0.777	0.784	614.00
20					0.771		614.00

H-field Measurements

Distance (cm)	Position A (A/m)	Position B (A/m)	Position C (A/m)	Position D (A/m)	Position E (A/m)	Around A to E (A/m)	Limit (A/m)
15	0.046	0.038	0.028	0.040	0.090	0.096	1.63
20					0.086		1.63

Note: The data above show that 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.

4. Test equipment used for test

	Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
■	DC Power Supply	AGILENT	E3632A	MY40004399	19.01.05
■	MAGNETIC FIELD TESTER	HIOKI	FT3470-52	171129500	18.12.26
■	Isotropic Electric Field	ETS Lindgren	HI-6105	00202714	19.04.25
■	Laser data Interface	ETS Lindgren	HI-6113	00150924	-