

RF Exposure Evaluation Report

Client: Garmin International
1200 E 151st Street
Olathe Kansas 66062 USA

Model: A04185

FCC ID: IPH-04185
IC: 1792A-04185

Test Report No.: RFE20220517-22-M1

MPE Labs FCC Cab Designation: US1060
MPE Labs ISED Cab Designation: US0177

Approved By:



Fox Lane,
EMC Test Engineer

Date: June 21, 2023

Total Pages: 7

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Revision Page

Rev. No.	Date	Description
Original	21 June 2023	Prepared by FLane

Regulatory Requirements:

FCC Part 1.1310, 2.1091, 2.1093
KDB 447498 D01
RSS-102, Issue 5

Summary:

The EUT's EIRP and conducted output power were used to evaluate for exemption from routine SAR testing.

EUT:

Model:	A04185
FCC ID:	IPH-04185
IC:	1792A-04185

MPE Lab	Nebraska Center for Excellence in Electronics
MPE Labs FCC Cab Designation:	US1060
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Antenna gain was determined by customer provided antenna report.

FCC Limits, Part 1.1310

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

Occupational/Controlled			☐					
General Population/uncontrolled			☒					
FCC Power Density Calculations								
Frequency	Conducted Power	Antenna Gain	Peak Power EIRP	Peak Power EIRP +10% for Tolerance	Power Density	Limit at specified distance	% of limit	Result
MHz	mW	numerical	mW	mW	mW/cm^2	mW/cm^2	%	
2402	2.54	1.26	3.20	3.52	0.001	1.00	0.070	PASS
2440	2.22	1.26	2.79	3.07	0.001	1.00	0.061	PASS
2480	1.88	1.26	2.37	2.60	0.001	1.00	0.052	PASS

Distance (d)	20	cm
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Note: The user's manual will stipulate that a 20cm distance from the user is to be maintained. EIRP values in mW were multiplied by 1.1 to account for a 10% tolerance.

The power density is calculated as shown below:

$$S = (P \times G) / (4 \times \pi \times d^2) - \text{used to calculate exposure "d"}$$

$$EIRP = P \times G, \text{ measured as field strength}$$

S = power density (mW/cm^2)

P = transmitter conducted power (mW)

G = antenna numeric gain (num)

d = distance to radiation center (cm)

24GHz Radio Passing % = 0.0588 / 1 = 1.616%

2.4GHz Radio Passing % = 0.012 / 1 = 1.2%

Total % to limit for SAR Evaluation = 2.816%

RSS 102, Issue 5, Section 2.5.2

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

2.5.2 Exemption Limits for Routine Evaluation – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz⁶ and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

ISED Power Density Calculations						
Frequency	Conducted Power	Antenna Gain Numerical	Peak EIRP Power	EIRP +10% Tolerance	Exemption Limit	Result
MHz	mW	Num.	mW	mW	mW	
2402.00	2.54	1.26	3.19	3.51	2676.42	PASS
2440.00	2.22	1.26	2.80	3.08	2676.42	PASS
2480.00	1.88	1.26	2.37	2.61	2676.42	PASS

$f(\text{MHz}) = 2.480 \text{ GHz}$ (Highest limit frequency within range, gives worst case limit)

Exemption limit = 4.09 mW (Extrapolated to 2480MHz @ $\leq 5\text{mm}$)

EIRP with 10% tolerance = 3.51 mW

Conducted with 10% tolerance = 2.80 mW

EUT is **EXEMPT** from SAR Testing

Result:

The EUT was found to be exempt from routine SAR testing and **COMPLIANT** with RF exposure requirements.

REPORT END