

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-M2

ISED CAB Identifier: US0177

Approved By:



Fox Lane,
EMC Test Engineer

Date: June 21, 2023

Total Pages: 7

The Nebraska Center for Excellence in Electronics (NCEE) authorizes the above-named company to reproduce this report provided it is reproduced in its entirety for use by the company's employees only. Any use that a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. NCEE accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This report applies only to the items tested.

Revision Page

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

Regulatory Requirements:

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

Summary:

The purpose of this report is to evaluate the EUT's 24GHz transmitter 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
MPE Labs ISED Cab Designation:	US0177

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

Antenna Gain (dBi)		Antenna Gain (Numerical)						
0		1						
Occupational/Controlled		☐						
General Population/uncontrolled		☒						
Power Density Calculations								
Frequency	EIRP	Antenna Gain (G _{num})	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	%	
24078	70.79	1.00	70.79	77.87	0.015	1.00	1.549	PASS
24125	73.85	1.00	73.85	81.24	0.016	1.00	1.616	PASS
24172	66.55	1.00	66.55	73.21	0.015	1.00	1.456	PASS

Distance (d)	20	cm
--------------	----	----

Numerical Antenna Gain = G_{num} set to 1.0 due to power measurement being calculated using radiated method

$S = (P \times G)/(4 \times \pi \times d^2)$ – used to calculate exposure “d”

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

$d = \sqrt{(S/(P \times G) \times 4 \times \pi)}$ – used to calculate minimum distance to meet limits

S = power density

P = transmitter conducted power (mW)

G = antenna numeric gain

d = distance to radiation center (cm)

Limits:

FCC Limit according to FCC Part 1.1310

10W/m² = 1mW/cm²

Complies

ISED Limit according to RSS-102 Issue 5, Sec 2.5.2:

RSS 102, Issue 5, Section 4 Table 4, 10W/m² = 1mW/cm²

Complies

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

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

[See RFE20220517-22-M1 for 2.4GHz MPE report]

Total % to limit for SAR Evaluation = 2.816%

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.

April 2021 TCB Workshop Training

Canada's new localized limits > 6 GHz

- February 2021, Health Canada introduced new localized (basic restrictions and reference levels) PD limits
 - < 30 GHz → harmonized w/ ICNIRP-2020 (averaged over 4-cm²)
 - > 30 GHz → spatial peak instead 1 cm² average
- New limits are now in effect

RSS 102, Issue 5, Section 4 Table 4

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)				
Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous [*]
0.1-10	-	0.73/ f	-	6 ^{**}
1.1-10	87/ f ^{0.5}	-	-	6 ^{**}
10-20	27.46	0.0728	2	6
20-48	58.07/ f ^{0.25}	0.1540/ f ^{0.25}	8.944/ f ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 f ^{0.3417}	0.008335 f ^{0.3417}	0.02619 f ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ f ^{1.2}
150000-300000	0.158 f ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616000/f ^{1.2}

Note: f is frequency in MHz.
^{*} Based on nerve stimulation (NS).
^{**} Based on specific absorption rate (SAR).

Result:

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

REPORT END