

RF Exposure Evaluation Report

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

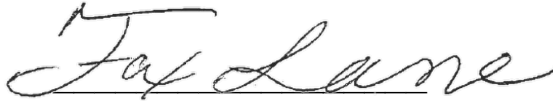
Model: A04540

FCC ID: IPH-04540
IC: 1792A-04540

Test Report No.: RFE20221213-20-02A

ISED CAB Identifier: US0177

Approved By:


Fox Lane,
EMC Test Engineer

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Total Pages: 5

Revision Page

Rev. No.	Date	Description
Original	23 February 2023	Prepared by – FLane
A	28 February 2023	Added references - FL

Regulatory Requirements:

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

Summary:

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

EUT:

FCC ID:	IPH-04540
IC:	1792A-04540

MPE Lab	Nebraska Center for Excellence in Electronics
MPE Labs FCC Cab Designation:	US1060
MPE Labs ISED Cab Designation:	US0177

24 GHz power density calculations:

P_T = power delivered to antenna = (EIRP / peak antenna gain)

EIRP = 59.314 mW Peak, measured at ISED registered EMC test laboratory

Peak antenna gain (G) = 10.55 dBi = 11.35 numeric (from antenna technical description)

Max duty cycle (DC) = 30% (from antenna technical description)

$$P_T = (EIRP / G * DC) = (59.314 / 11.35 * 0.30) = 1.568 \text{ mW}$$

A_s = Antenna surface area = 7.74 cm² (see following page)

Power Density = P_T / A_s

Power density = 1.568 mW / 7.74 cm² = 0.203 mW/cm²

Averaged over 4 cm² = 0.203 / 4 = 0.051 mW/cm²

Power density limit from eCFR 1.1310(e)(ii) and RSS-102, Issue 5, Table 4 = 10 W/m² = 1 mW/cm²

24GHz radio limit passing % = Radar% = 5.1%

2.4GHz radio Limit passing % = 2.4GHz% = 2.32%

Total Limit % = 2.4GHz% + Radar% = 2.32 + 5.1 < 100%, therefore exempt

Because the amount of power available over the entire surface of the antenna averaged over the 4 cm² area, we believe there is no way power density measurements could result in a non-compliant device.

From 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

Power density limit from RSS-102, Issue 5, Table 4 = 10 W/m² = 1 mW/cm²

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).