

| | | | | | | |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------------------------------------------|---------------------------------------------------|----------------------------------------|----------------------------------------|
| Garmin | Model: AA2557 | Test Number: | 151211 | | | |
| MPE Calculator | MPE uses EIRP for calculation. EIRP is based on TX power added to the antenna gain in dBi. dBi = dB gain compared to an isotropic radiator. S = power density in mW/cm ² | | | | | |
| | | Output Power | dBd + 2.17 = dBi | Antenna Gain (dBi) | 1 | |
| Tx Frequency (MHz) | 2437 | Maximum (Watts) | 0.009616 | dBi to dBd | 2.2 | |
| | | Power Corrected for Transmitter Duty cycle of 3.5% | 0.000337 | Antenna Gain (dBd) | -1.17 | |
| Cable Loss (dB) | 0.0 | (dBm) | -4.7 | Antenna minus cable (dB) | 1.00 | |
| | Calculated ERP (mw) 0.257 | | EIRP = Po(dBm) + Gain (dB) | | | |
| | Calculated EIRP (mw) 0.424 | | ERP = EIRP - 2.17 dB | Radiated (EIRP) dBm | -3.729 | |
| | | | | Radiated (ERP) dBm | -5.899 | |
| | <div style="border: 1px solid black; padding: 5px;"> Power density (S) $EIRP = \frac{P}{4 \pi r^2}$ $S = \frac{EIRP}{4 \pi r^2}$ EIRP (mW), r (cm) </div> | | | | | |
| | FCC radio frequency radiation exposure limits per 1.1310 | | | | | |
| | | Frequency (MHz) | Occupational Limit (mW/cm ²) | Public Limit (mW/cm ²) | | |
| 5 | mW/cm ² | 300-1,500 | ƒ300 | ƒ1500 | | |
| 50 | W/m ² | 1,500-10,000 | 5 | 1 | | |
| | General Public Limit | | | | | |
| 1 | mW/cm ² | | | | | |
| 10 | W/m ² | | | | | |
| | IC radio frequency radiation exposure limits per RSS-102 | | | | | |
| | | Frequency (MHz) | Occupational Limit (W/m ²) | Public Limit (W/m ²) | | |
| 0.6455f ^{0.5} | W/m ² | 100-6,000 | 0.6455f ^{0.5} | | | |
| 0.95332 | W/m ² | 6,000-15,000 | 50 | | | |
| | General Public Limit | | | | | |
| 0.02619f ^{0.6834} | W/m ² | 48-300 | | 1.291 | | |
| 5.40397 | W/m ² | 300-6,000 | | 0.02619f ^{0.6834} | | |
| | | 6,000-15,000 | 50 | 10 | | |
| EIRP | S | S | Distance | Distance | Distance | |
| milliwatts | mW/cm ² | W/m ² | cm | meter | inches | |
| 0.424 | 0.00000 | 0.00004 | 90.00 | 0.90 | 35.43 | |
| 0.424 | 0.00001 | 0.00005 | 80.00 | 0.80 | 31.50 | |
| 0.424 | 0.00001 | 0.00007 | 70.00 | 0.70 | 27.56 | |
| 0.424 | 0.00001 | 0.00009 | 60.00 | 0.60 | 23.62 | |
| 0.424 | 0.00001 | 0.00013 | 50.00 | 0.50 | 19.69 | |
| 0.424 | 0.00002 | 0.00021 | 40.00 | 0.40 | 15.75 | |
| 0.424 | 0.00004 | 0.00037 | 30.00 | 0.30 | 11.81 | |
| 0.424 | 0.00008 | 0.00084 | 20.00 | 0.20 | 7.87 | |
| 0.424 | 0.00034 | 0.00337 | 10.00 | 0.10 | 3.94 | |
| 0.424 | 0.00053 | 0.00527 | 8.00 | 0.08 | 3.15 | |
| 0.424 | 0.00094 | 0.00937 | 6.00 | 0.060 | 2.36 | |
| 0.424 | 0.00135 | 0.01349 | 5.00 | 0.050 | 1.97 | |
| 0.424 | 0.00211 | 0.02107 | 4.00 | 0.040 | 1.57 | |
| 0.424 | 0.00375 | 0.03746 | 3.00 | 0.030 | 1.18 | |
| 0.424 | 0.00843 | 0.08429 | 2.00 | 0.020 | 0.79 | |
| 0.424 | 0.03372 | 0.33718 | 1.00 | 0.010 | 0.39 | |
| 0.424 | 0.13487 | 1.34871 | 0.50 | 0.005 | 0.20 | |
| | | | | | | |
| | | Frequency (MHz) | Occupational Limit minimum Distance (meters) | Occupational Limit minimum Distance (cm / inches) | Public Limit minimum distance (meters) | Public Limit minimum distance (meters) |
| | | 47CFR 1.1310 | N/A | N/A | N/A | N/A |
| | | RSS-102 | N/A | N/A | N/A | N/A |

Rogers Labs, Inc.
 4405 West 259th Terrace
 Louisburg, KS 66053
 Phone/Fax: (913) 837-3214
 Revision 1

Garmin International, Inc.
 Model: AA2557
 Test #: 151211
 Test to: CFR47 15C, RSS-247
 File: AA2557 SAR Exclusion

SN: 4MQ000062
 FCC ID: IPH-A2557
 IC: 1792A-A2557
 Date: January 26, 2016
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The AA2557 is an Extremity Worn Digital Transceiver. This device operates as an intermittent Transmitter with a low duty cycle operating in the 802.11b,g,n, ANT/BLE, 2400 MHz band. The 802.11 modes transmit at measured average output power of 9.83 dBm (9.61 mW) and the ANT/ BLE mode transmits at maximum 4dBm (2.5mW).

Simultaneous transmission of the two modes does not occur as both transmitter circuits utilize the same antenna system. Data is collected from internal sensors as well as global positioning and stored in the device's memory. At the end of the activity, the device will turn on the Wi-Fi IC and search (ping) for a known Wi-Fi router. If this fails the transmitter will be turned off and another attempt made after 5-minutes. The device makes up to 12 attempts before abandoning a pending upload. Each search takes approximately 300 milliseconds. A typical upload file size is 100kB and takes approximately 2.5 seconds to upload. Once the upload occurs, the memory is cleared and no further transmissions occur until another activity is commenced. The user can initiate the upload in the event a known Wi-Fi router is located. Due to battery capacity, the device is incapable of operating in excess of 24 hours at maximum configuration. Periodic software updates may occur which involve some handshake between the router lasting 0.5 seconds. Using the source-based transmit interval from above of 5 minutes, two 300ms pings and a conservative 10 second upload, the source-based duty cycle equates to:

$$(2 \times (0.3s) + 10s) / 300s = 3.5\%$$

Adjusting for worst-case transmit power rating of 9.61 mW:

$$P_{ADJ} = 3.5\% \times 9.61mW = 0.34mW$$

FCC – The FCC Exclusion threshold per KDB 447498 D01 V05r02 Appendix A @ 2450 MHz and 5mm distance on body extremity is 10mW X 2.5 which equates to 25 mW

IC – The Industry Canada threshold per RSS-102 Table 1 @ 2450 MHz and 5mm distance on body extremity is 4mW X 2.5 which equates to 10 mW

Conclusion: Applying the requirements of KDB 447498 4.3.1 for standalone SAR test exclusion using the extremity limit:

$$[P (mW) / d (mm)] \times \sqrt{f (GHz)} \text{ must be less than } 7.5$$

$$(3.927/5) \times 1.57 = 1.23$$

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