



# A Test Lab Techno Corp.

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## SAR Test Exclusion Evaluation



|                       |  |
|-----------------------|--|
| Test Report No.       | : 1307FS12   |
| Applicant             | : Garmin International Inc.  |
| Manufacturer          | : Garmin Corporation   |
| Product Type          | : VIRB Elite   |
| Trade Name            | : Garmin   |
| Model Number          | : O3AHGT01   |
| Dates of Received     | : May 08, 2013   |
| Dates of Test         | : Jul. 02, 2013  |
| Dates of Issued       | : Jul. 30, 2013  |
| Test Specification    | : 47 CFR § 2.1093<br>KDB 447498 D01 General RF Exposure Guidance v05r01<br>KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r01<br>RSS-102 Issue 4 |
| Location of Test Lab. | : Chang-an Lab.  |

1. The test operations have to be performed with cautious behavior, the test results are as attached.
2. The test results are under chamber environment of A Test Lab Techno Corp. A Test Lab Techno Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples.
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Approved By : Yung-Tan Tsai Tested By : Bill Hu  
(Yung Tan Tsai) (Bill Hu)



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## 1. Description of Equipment under Test (EUT)

|                                     |   |
|-------------------------------------|---|
| Applicant                           | Garmin International Inc.   |
| Applicant Address                   | 1200 E., 151st. Street, Olathe, Kansas, United States, 66062  |
| Manufacturer                        | Garmin Corporation  |
| Manufacturer Address                | No.68, Zhangshu 2nd Rd., Xizhi Dist., New Taipei City 221, Taiwan   |
| Product Type                        | VIRB Elite  |
| Trade Name                          | Garmin  |
| Model Number                        | O3AHGT01  |
| FCC ID                              | IPH-02114   |
| Frequency Range                     | 2412 - 2462 MHz IEEE 802.11b / IEEE 802.11g<br>2402 - 2479 MHz 2.4GHz ANT                                   |
| Transmit Power<br>(conducted power) | 0.020 W / 12.93 dBm (IEEE 802.11b)<br>0.009 W / 9.60 dBm (IEEE 802.11g)<br>0.002 W / 1.77 dBm (2.4G Hz ANT) |
| Antenna Specification               | IEEE 802.11b, IEEE 802.11g:2.22 dBi<br>2.4GHz ANT: 2.22 dBi   |
| Antenna Designation                 | chip antenna  |
| Temperature Range                   | -30 ~ +70°C   |

The above equipment was tested by A Test Lab Techno Corp. For compliance with the requirements set forth in 47 CFR § 2.1093 & OET65 Supplement C. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.



## 2. SAR Test Exclusion

As RF exposure evaluation of portable device, SAR test is not required when the evaluation results. According to KDB 447498 4.3.1, unless excluded by specific FCC test procedures, portable devices shall include SAR data for equipment approval. SAR test necessity will be based on the exclusion result.

The test exclusion refers KDB 447498 as below:

### ≤50mm:

$$\left[ \frac{\text{max. power of channel, including tune-up tolerance, mW}}{\text{min. test separation distance, mm}} \right] \cdot \sqrt{f(\text{GHz})}$$
  
≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

### >50mm and <200mm:

- a) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·( f(MHz)/150)] mW, at 100 MHz to 1500 MHz
- b) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

## 2.1 Antenna Distance

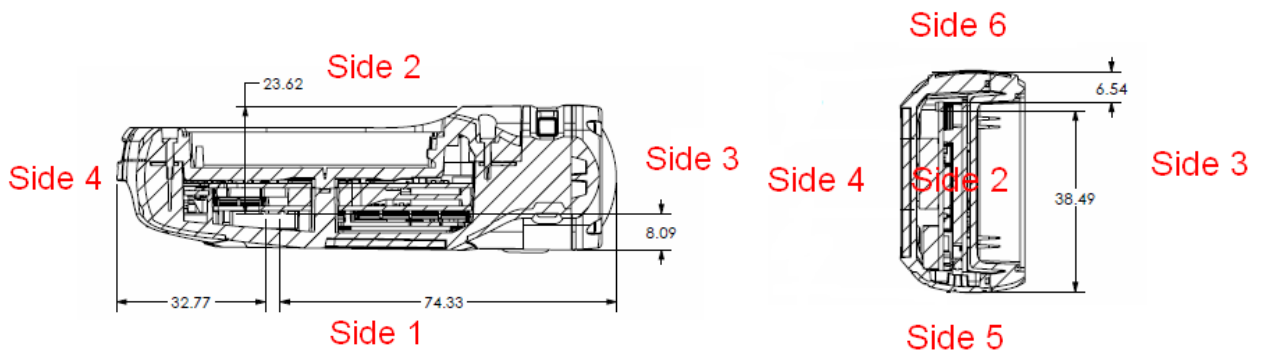
Antenna to Side (The evaluated distance available extremity SAR as below):

| Distance of Antenna to edge |        |               |
|-----------------------------|--------|---------------|
| Antenna                     | Side   | Distance (mm) |
| WLAN                        | Side 1 | 8.09          |
| WLAN                        | Side 2 | 23.62         |
| WLAN                        | Side 3 | 74.33         |
| WLAN                        | Side 4 | 32.77         |
| WLAN                        | Side 5 | 38.49         |
| WLAN                        | Side 6 | 6.54          |

Antenna to Body (The evaluated distance available body SAR as below)

| Distance of Antenna to edge |        |               |
|-----------------------------|--------|---------------|
| Antenna                     | Side   | Distance (mm) |
| WLAN                        | Side 1 | 23.09         |
| WLAN                        | Side 2 | 38.62         |
| WLAN                        | Side 3 | 89.33         |
| WLAN                        | Side 4 | 47.77         |
| WLAN                        | Side 5 | 53.49         |
| WLAN                        | Side 6 | 21.54         |

Note: The use distance more than 1.5cm, therefore distance of antenna to body should be increased 1.5cm (from antenna to side).





## 2.2 Conducted Power

| Band         | Date Rate | CH | Frequency (MHz) | Time-Avg. Conducted power (dBm) |
|--------------|-----------|----|-----------------|---------------------------------|
| IEEE 802.11b | 1M        | 1  | 2412.0          | <b>12.93</b>                    |
|              |           | 6  | 2437.0          | 11.86                           |
|              |           | 11 | 2462.0          | 10.95                           |
|              | 2M        | 6  | 2437.0          | 11.54                           |
|              | 5.5M      | 6  | 2437.0          | 10.41                           |
|              | 11M       | 6  | 2437.0          | 9.12                            |
| IEEE 802.11g | 6M        | 1  | 2412.0          | <b>9.60</b>                     |
|              |           | 6  | 2437.0          | 8.91                            |
|              |           | 11 | 2462.0          | 7.88                            |
|              | 9M        | 6  | 2437.0          | 8.07                            |
|              | 12M       | 6  | 2437.0          | 5.33                            |
|              | 18M       | 6  | 2437.0          | 3.69                            |
|              | 24M       | 6  | 2437.0          | 0.90                            |
|              | 36M       | 6  | 2437.0          | -0.35                           |
|              | 48M       | 6  | 2437.0          | -3.10                           |
|              | 54M       | 6  | 2437.0          | -3.24                           |

| Band       | Frequency (MHz) | Average Power (dBm) |
|------------|-----------------|---------------------|
| 2.4GHz ANT | 2402.0          | <b>1.77</b>         |
|            | 2457.0          | -0.38               |
|            | 2479.0          | -1.07               |



## 2.3 Evaluation Results

The evaluation of SAR test reduction according to KDB447498

SAR test is not required when the results showed "SAR is not required".

Extremity SAR:

| ≤ 50 mm |              |         |             |                 |               |            |        |       |                          |
|---------|--------------|---------|-------------|-----------------|---------------|------------|--------|-------|--------------------------|
| Side    | Band         | Channel | Power (dBm) | Frequency (GHz) | distance (mm) | Power (mW) | Result | Limit | exclusion considerations |
|         |              |         |             |                 |               |            |        |       | SAR <sub>10g</sub>       |
| 1       | IEEE 802.11b | 1       | 12.93       | 2.412           | 8.09          | 20         | 3.8    | 7.5   | SAR is not required      |
|         | 2.4GHz ANT   | ---     | 1.77        | 2.402           | 8.09          | 2          | 0.4    | 7.5   | SAR is not required      |
| 2       | IEEE 802.11b | 1       | 12.93       | 2.412           | 23.62         | 20         | 1.3    | 7.5   | SAR is not required      |
|         | 2.4GHz ANT   | ---     | 1.77        | 2.402           | 23.62         | 2          | 0.1    | 7.5   | SAR is not required      |
| 4       | IEEE 802.11b | 1       | 12.93       | 2.412           | 32.77         | 20         | 0.9    | 7.5   | SAR is not required      |
|         | 2.4GHz ANT   | ---     | 1.77        | 2.402           | 32.77         | 2          | 0.1    | 7.5   | SAR is not required      |
| 5       | IEEE 802.11b | 1       | 12.93       | 2.412           | 38.49         | 20         | 0.8    | 7.5   | SAR is not required      |
|         | 2.4GHz ANT   | ---     | 1.77        | 2.402           | 38.49         | 2          | 0.1    | 7.5   | SAR is not required      |
| 6       | IEEE 802.11b | 1       | 12.93       | 2.412           | 6.54          | 20         | 4.7    | 7.5   | SAR is not required      |
|         | 2.4GHz ANT   | ---     | 1.77        | 2.402           | 6.54          | 2          | 0.5    | 7.5   | SAR is not required      |

| > 50 mm and <200mm |              |         |             |                 |               |            |  |                          |  |
|--------------------|--------------|---------|-------------|-----------------|---------------|------------|--|--------------------------|--|
| Side               | Band         | Channel | Power (dBm) | Frequency (GHz) | distance (mm) | Power (mW) | Power thresholds SAR <sub>10g</sub> (mW) | exclusion considerations |  |
|                    |              |         |             |                 |               |            |  | SAR <sub>10g</sub>       |  |
| 3                  | IEEE 802.11b | 1       | 12.93       | 2.412           | 74.33         | 20         | 485                                      | SAR is not required      |  |
|                    | 2.4GHz ANT   | ---     | 1.77        | 2.402           | 74.33         | 2          | 485                                      | SAR is not required      |  |



Body SAR:

| ≤ 50 mm |              |         |             |                 |               |            |        |       |                          |
|---------|--------------|---------|-------------|-----------------|---------------|------------|--------|-------|--------------------------|
| Side    | Band         | Channel | Power (dBm) | Frequency (GHz) | distance (mm) | Power (mW) | Result | Limit | exclusion considerations |
|         |              |         |             |                 |               |            |        |       | SAR <sub>1g</sub>        |
| 1       | IEEE 802.11b | 1       | 12.93       | 2.412           | 23.09         | 20         | 1.3    | 3     | SAR is not required      |
|         | 2.4GHz ANT   | ---     | 1.77        | 2.402           | 23.09         | 2          | 0.1    | 3     | SAR is not required      |
| 2       | IEEE 802.11b | 1       | 12.93       | 2.412           | 38.62         | 20         | 0.8    | 3     | SAR is not required      |
|         | 2.4GHz ANT   | ---     | 1.77        | 2.402           | 38.62         | 2          | 0.1    | 3     | SAR is not required      |
| 4       | IEEE 802.11b | 1       | 12.93       | 2.412           | 47.77         | 20         | 0.7    | 3     | SAR is not required      |
|         | 2.4GHz ANT   | ---     | 1.77        | 2.402           | 47.77         | 2          | 0.1    | 3     | SAR is not required      |
| 6       | IEEE 802.11b | 1       | 12.93       | 2.412           | 21.54         | 20         | 1.4    | 3     | SAR is not required      |
|         | 2.4GHz ANT   | ---     | 1.77        | 2.402           | 21.54         | 2          | 0.1    | 3     | SAR is not required      |

| > 50 mm and <200mm |              |         |             |                 |               |            |   |                          |  |
|--------------------|--------------|---------|-------------|-----------------|---------------|------------|---|--------------------------|--|
| Side               | Band         | Channel | Power (dBm) | Frequency (GHz) | distance (mm) | Power (mW) | Power thresholds SAR <sub>1g</sub> (mW) | exclusion considerations |  |
|                    |              |         |             |                 |               |            |   | SAR <sub>1g</sub>        |  |
| 3                  | IEEE 802.11b | 1       | 12.93       | 2.412           | 89.33         | 20         | 490                                     | SAR is not required      |  |
|                    | 2.4GHz ANT   | ---     | 1.77        | 2.402           | 89.33         | 2          | 490                                     | SAR is not required      |  |
| 5                  | IEEE 802.11b | 1       | 12.93       | 2.412           | 53.49         | 20         | 131                                     | SAR is not required      |  |
|                    | 2.4GHz ANT   | ---     | 1.77        | 2.402           | 53.49         | 2          | 132                                     | SAR is not required      |  |