



A Test Lab Techno Corp.

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MPE Report

Test Report No.	: 1306FS15
Applicant	: Garmin International, Inc.
Manufacturer	: Garmin Corporation
Product Type	: Garmin HUD
Trade Name	: Garmin
Model Number	: Garmin HUD
Dates of Receive	: Jun. 03, 2013
Dates of Test	: Jun. 10, 2013
Issued Date	: Jun. 21, 2013
Test Specification	: 47 CFR § 2.1091 47 CFR §1.1310 ANSI / IEEE Std.C95.1-1992
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	Garmin HUD
Trade Name	Garmin
Model Number	Garmin HUD
Frequency Range	2402 - 2480 MHz Bluetooth
Transmit Power (conducted power)	Bluetooth : 0.00172 W / 2.35 dBm
Antenna Specification	Bluetooth : 0.51 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 § 2.1091 & 47 CFR § 1.1310. 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. Human Exposure Assessment

Due to the design and installation of this product, it is not possible to conduct SAR evaluation. This is because client either manufactures or supplies the antenna(s) that will be used in the installation of this product. Therefore, this product will be evaluated as a mobile device per 47 CFR §1.1310 titled "Radiofrequency radiation exposure limits", generally referred to as MPE limits.

In 47 CFR § 2.1091, paragraph (b) defines a mobile device as "a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. " This product is intended to be installed into a vehicle such that the unit is physically secured at one location. In the installation guide supplied with the product,

Client has made the following statement: "IMPORTANT: To meet the FCC's RF Exposure Guidelines, the antenna should be installed so there is at least 20 cm of separation between the body of the user and nearby persons and the antenna". Based on the installation of the transceiver and the antenna, the transmitters radiating structure is more than 20 cm from the user. Thus, this product is a "mobile device" as defined in section § 2.1091 paragraph (b).

Exposure evaluation

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4\pi R^2}$$

Where

S: power density

P: power input to the antenna

G: power gain of the antenna in the direction of interest relative to an isotropic radiator.

R: distance to the center of radiation of the antenna.



3. RF Output Power

Band	CH	Frequency (MHz)	Packet Type	Average Conducted Output Power (dBm)
Bluetooth (GFSK)	0	2402	DH1	-1.80
			DH3	1.69
			DH5	2.35
	39	2441	DH1	-1.96
			DH3	1.18
			DH5	1.85
	78	2480	DH1	-3.09
			DH3	0.07
			DH5	0.74
Bluetooth ($\pi/4$ -DQPSK)	0	2402	DH1	-3.62
			DH3	-1.23
			DH5	-0.65
	39	2441	DH1	-4.36
			DH3	-2.00
			DH5	-1.50
	78	2480	DH1	-5.75
			DH3	-3.41
			DH5	-2.86
Bluetooth (8DPSK)	0	2402	DH1	-3.60
			DH3	-1.20
			DH5	-0.63
	39	2441	DH1	-4.33
			DH3	-1.98
			DH5	-1.48
	78	2480	DH1	-5.66
			DH3	-3.39
			DH5	-2.84



4. Test Result

Band	Data Rate	Frequency (MHz)	Limit (mw)	Distance [R] (cm)	Max tune-up Power (upper limit) [P] (dBm)	ANT Gain [G] (dB)	Duty Cycle	[P]+ [G] with Duty cycle [TP] (W)	Power Density [S] (mw)/cm ²
Bluetooth	---	2402.0	1.000	20	4	0.51	1	0.003	0.001
		2441.0	1.000	20	4	0.51	1	0.003	0.001
		2480.0	1.000	20	4	0.51	1	0.003	0.001