




# TEST REPORT

**Report No.** ..... : **CHTW24070099** Report verification: 

**Project No.** ..... : **SHT2407005804W**

**FCC ID** ..... : **K6630653Y3D**

**Applicant's name** ..... : **YAESU MUSEN CO., LTD.**

**Address**..... : Omori Bellport D building 3F, 6-26-3 Minamioi, Shinagawa-ku, Tokyo 140-0013 Japan

**Product name**..... : **VHF FM Marine Transceiver**

**Trade Mark** ..... : Standard Horizon

**Model No.** ..... : GX1410GPS

**Listed Model(s)** ..... : GX1410


**Standard** ..... : **FCC CFR Title 47 Part 2.1091**


**Date of receipt of test sample**..... : Jul.09, 2024

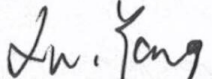
**Date of testing**..... : Jul.10, 2024 - Jul.22, 2024

**Date of issue**..... : Jul.23, 2024

**Result**..... : **PASS**

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**Testing Laboratory Name** ..... : **Shenzhen Huatongwei International Inspection Co., Ltd.**

**Address**..... : Building 7, Baiwang Idea Factory, No.1051, Songbai Road, Yangguang Community, Xili Subdistrict, Nanshan District, Shenzhen, Guangdong, China

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*The test report merely correspond to the test sample.*

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# **1 TEST STANDARDS AND REPORT VERSION**

## **1.1. Test standard**

The tests were performed according to following standards:

[FCC 47 Part 2.1091](#): Radiofrequency radiation exposure evaluation: mobile devices.

[FCC 47 Part 1.1310](#): Radiofrequency radiation exposure limits.

[FCC 47 Part 1.1307\(b\)](#): Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.

[KDB 447498 D04 Interim General RF Exposure Guidance v01](#): Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies

## **1.2. Report revised information**

Revised No.	Date of issued	Description
N/A	2024-07-23	Original

## 2 SUMMARY

### 2.1 Client information

Applicant:	YAESU MUSEN CO., LTD.
Address:	Omori Bellport D building 3F, 6-26-3 Minamioi, Shinagawa-ku, Tokyo 140-0013 Japan
Manufacturer:	YAESU MUSEN CO.,LTD.
Address:	43 Utsuroda, Morijuku, Sukagawa-shi,Fukushima 962-0001 Japan

### 2.2 Product description

Main unit information:	
Product name:	VHF FM Marine Transceiver
Trade mark:	Standard Horizon
Model No.:	GX1410GPS
Listed model(s):	GX1410
Power supply:	DC 13.8V
Hardware version:	N/A
Software version:	N/A

### 2.3 Radio Specification Description <sup>\*1</sup>

Operation Frequency Range:	TX:156.025MHz to 157.425MHz RX:156.050MHz to 162.000MHz	
Rated Output Power:	<input checked="" type="checkbox"/> High Power: 25W <input checked="" type="checkbox"/> Low Power: 1W	
Modulation Type:	Analog:	FM
	Digital Data(DSC):	AFSK
Channel Separation:	Analog:	<input checked="" type="checkbox"/> 25kHz
	Digital Data(DSC):	<input checked="" type="checkbox"/> 25kHz
Emission Designator: <sup>*2</sup>	Analog:	16K0G3E
	Digital Data(DSC):	16K0G2B

Note:

- (1) <sup>\*1</sup> This information is provided by this applicant.
- (2) <sup>\*2</sup> According to FCC Part 2.202 requirements, the Necessary Bandwidth is calculated as follows:
- For FM Voice Modulation  
 Channel Spacing = 25 KHz, D = 5KHz max, K = 1, M = 3KHz  
 $B_n = 2M + 2DK = 2*3 + 2*5*1 = 16 \text{ KHz}$   
 Emission designation: 16K0G3E
  - Digital Data(DSC)  
 Channel Spacing = 25 KHz, D = 5KHz max, K = 1, M = 3KHz  
 $B_n = 2M + 2DK = 2*3 + 2*5*1 = 16 \text{ KHz}$   
 Emission designation: 16K0G2B

## 2.4 Testing laboratory information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.	
Laboratory Location	Building 7, Baiwang Idea Factory, No.1051, Songbai Road, Yangguang Community, Xili Subdistrict, Nanshan District, Shenzhen, Guangdong, China	
Connect information:	Tel: 86-755-26715499 E-mail: <a href="mailto:cs@szhtw.com.cn">cs@szhtw.com.cn</a> <a href="http://www.szhtw.com.cn">http://www.szhtw.com.cn</a>	
Qualifications	Type	Accreditation Number
	FCC Test Firm Registration Number	762235
	FCC Designation Number	CN1181

### 3 TEST CONFIGURATION

#### 3.1 Test frequency list

Mode	Modulation	Operation Frequency Range	Test Frequency (MHz)	
Analog	FM	Tx: 156.025MHz to 157.425MHz Rx: 156.050MHz to 162.000MHz	CH <sub>L</sub>	Tx: 156.025(CH60) Rx: 156.050(CH1001)
			CH <sub>M</sub>	Tx: 156.800(CH16) Rx: 156.800(CH16)
			CH <sub>H</sub>	Tx: 157.425(CH88) Rx: 162.000(CH28)
Digital Data (DSC)	AFSK		CH <sub>M1</sub>	Tx: 156.525(CH70) Rx: 156.525(CH70)

#### 3.2 Operation mode

Test mode	Transmitting	Receiving	Power level	
			High	Low
TX-AWH	√		√	
TX-DSC	√		√	

Note: √: is operation mode.

#### 3.3 Testing environmental condition

Type	Requirement	Actual
Temperature:	15~35°C	25°C
Relative Humidity:	25~75%	50%
Air Pressure:	860~1060mbar	1000mbar

#### 3.4 Measurement uncertainty

No.	Test Items	Measurement Uncertainty
1	Radiofrequency radiation exposure evaluation	4.54dB for 30MHz-1GHz 5.10dB for above 1GHz

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

### 3.5 Equipment used during the testing

● Radiated Spurious Emission							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0122	SAC-3m-01	C11121	2023/04/17	2026/04/16
●	Field Probe	AR	HTWE0591	FL7006/KIT	0357798	2024/4/30	2025/4/29

## 4 TEST CONDITIONS AND RESULTS

### 4.1. Limit

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength(V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
<b>30–300</b>	<b>61.4</b>	<b>0.163</b>	<b>1.0</b>	<b>6</b>
300–1500	-	-	f/300	6
1500–100,000	-	-	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 <sup>2</sup> )	30
30–300	27.5	0.073	0.2	30
300–1500	-	-	f/1500	30
1500–100,000	-	-	1.0	30

Note: f = frequency in MHz

### **EVALUATION METHOD**

Transmission formula:  $Pd = (Pout * G) / (4 * \pi * r^2)$

Where

**Pd** = power density in mW/cm<sup>2</sup>, **Pout** = output power to antenna in mW, **G** = gain of antenna in linear scale;

**Pi** = 3.1416, **R** = distance between observation point and center of the radiator in cm



**TEST RESULT** **Passed**       **Not Applicable**

Frequency Range(MHz)	Maximum conducted output power(W)	Antenna Gain (dBi)	Duty Cycle	Safety Distance(cm)	Power Density (mW/cm <sup>2</sup> )	Power Density Limit (mW/cm <sup>2</sup> )
156.025-157.425	25	-10.0	50%	10.0	0.99	1.0
156.025-157.425	25	-5.0	50%	18.0	0.97	1.0
156.025-157.425	25	-3.5	50%	22.0	0.92	1.0
156.025-157.425	25	0.0	50%	32.0	0.97	1.0
156.025-157.425	25	3.5	50%	48.0	0.97	1.0
156.025-157.425	25	5.0	50%	57.0	0.97	1.0
156.025-157.425	25	10.0	50%	100.0	0.99	1.0

Note:

- 1) If the antenna gain is 3.5dBi, The exposure safety distance is at least 48cm.

## 4.2. Measurement Procedure

1. Polarization of the EUT's antenna was vertical, which is its polarization in actual use.
2. The EUT at the chosen modulation was set to transmit at the chosen frequency at maximum RF power and at 50% duty cycle (50% duty cycle is simulated either by lowering the radio's power by 3dB or by using a 3 dB pad on the output of the radio). During preliminary measurements, we set the distance between the power density probe and the investigated EUT's antenna equal to the average calculated  $R_{safe}$  applicable either for controlled or uncontrolled environments.
3. Power density measurements were taken at different heights of the probe from the ground (0.1 to 2 meters) while rotating versus azimuth (from 0° to 360°) the antenna.
4. The azimuth between the probe and the antenna position corresponding to the highest MPE level was chosen as the "worst case" position for the final measurements.
5. For the final measurements, we adjusted the distance between the test probe and the tested antenna to the real safe distance,  $R_{real}$ , such that the measured highest power density in the "worst case" position was the same or slightly less than the test limit.
6. The measurement results of final measurements conducted at the chosen azimuth and different heights of the probe above the ground.
7. Average values of power density were calculated for the imaginary whole human body (0.1–2.0 m), for the lower part of the body (0.1–0.9 m) and for the upper part of the body (1.0–2.0 m).

### 4.3. Test Results

EME Data:

Measuring Antenna Height(cm)	FCC Part 2.1091		
	Controlled RF Exposure(mW/cm <sup>2</sup> )		
	3.5dBi Antenna 48cm	3.5dBi Antenna 58cm	3.5dBi Antenna 68cm
10	0.23	0.21	0.19
20	0.28	0.25	0.22
30	0.34	0.29	0.25
40	0.42	0.35	0.29
50	0.51	0.41	0.33
60	0.63	0.49	0.38
70	0.76	0.56	0.42
80	0.88	0.62	0.46
90	0.96	0.66	0.48
100	0.96	0.66	0.48
110	0.88	0.62	0.46
120	0.76	0.56	0.42
130	0.63	0.49	0.38
140	0.51	0.41	0.33
150	0.42	0.35	0.29
160	0.34	0.29	0.25
170	0.28	0.25	0.22
180	0.23	0.21	0.19
190	0.20	0.18	0.16
200	0.17	0.15	0.14

EME for Body Parts:

Part of the body/averaging points(m)	FCC Part 2.1091
	Controlled RF Exposure
	3.5dBi Antenna 48cm (mW/cm <sup>2</sup> )
Whole body (0.1 to 2.0 )	0.96
Lower body (0.1 to 0.9)	0.96
Upper body (1.0 to 2.0 )	0.96

### 4.4. Conclusion

The User Manual shall include RF radiation safety warnings:

The antenna of this device must be installed on the roof or trunk of the vehicle. If the gain of the used antenna is 3.5dBi, the minimum mobile separation distance  $R_{safe} = 48.00\text{cm}$ .

## 5 TEST SETUP PHOTOS



## 6 EXTERNAL AND INTERNAL PHOTOS

Refer to the test report No.: CHTW24070094