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Federal Communications Commission
Authorization and Evaluation Division

RE: **Class II Permissive Change**
FCC ID: **PJ5RAY54**

The RAY54 is a VHF/FM marine radio with class "D" DSC functionality. To share the same platform as its European version (RAY54E) in production, the following modifications will be adapted into the Ray54 North American model.

RF Board

1. Improve immunity to radiated radio frequencies highlighted by IEC60945 Part 10.4:
 - Delete IC2A NJM2904, R7, R6, R8, R9, R10, R12, C30, C36, and Q1 at a high pass filter circuit.
 - Change the value of C137, C138, and R46 to compensate the deletion of the high pass filter circuit.
 - Change the CPU board by adding 1000pF decoupling capacitors along the connector (J202).
2. Improve high power adjustment by changing R66 from 10kohms to 15kohms and R89 from 2.2kohms to 3.3kohms.
3. Improve output power stability by changing the values of the front end matching components: C1, C6, C47 and deleting C62.
4. Improve receiver sensitivity by changing R69 from 1.2kohms to 470ohms.
5. Improve squelch adjustment by changing R41 from 100kohms to 560kohms.
6. Protect IC1 from over voltage by changing R89 from 2.2kohms to 3.3kohms.
7. Add distance and local function for the receiver side by adding R58, R195, Q16, and C29.
8. Improve blocking performance on the 2nd receiver circuit by tuning the values of C508, L511, C519, R508, and R517.



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CPU Board

1. Improve I/O port transmission stability by using pull down resistors R272 and R277.
2. Enhance the CPU I/O port protection by changing R232 from 1kohms to 4.7kohms, R254 from 1kohms to 4.7kohms, and by adding D212 as a protection diode.
3. Improve the microphone muting control by changing R201 from 47kohms to 4.7kohms.
4. Improve the consistency of the frequency deviation when transmitting by Microphone versus transmitting by DSC. R233 is changed from 20kohms to 27kohms.
5. Add temperature compensation to the backlighting circuit.
6. Use a different Photocoupler (TLP180) to improve the radio programming stability.

All of the above changes should not affect previous performance. To be certain, Radiated Emission Limitations (Radiated), Transmitter Power, Transmitter Frequency Tolerance, and Bandwidths retests were conducted to ensure compliance, and the results show that the unit continues to be compliant. The shield case will be wrapped with additional shielding in production to further improve the Radiated Emission performance.

We hereby declare that with all the above modifications, the Ray54 will continue to comply with FCC specification Part 80 as a class D DSC VHF Marine Radio.

Sincerely,

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