849 NW State Road 45
Newberry, Fl 32669 USA
Phone: 888.472.2424 or 352.472.5500
Fax: 352.472.2030
Email: info@timcoengr.com
Website: www.timcoengr.com

FCC PART 15

SCANNING RECEIVER

Applicant	YAESU MUSEN CO., LTD.
Address	TENNOZU PARKSIDE BUILDING
	2-5-8 HIGASHI-SHINAGAWA, SHINAGAWA-KU, TOKYO 140-0002 JAPAN
FCC ID:	K6620485X40
Model Number	FTM-100DR
Product Description	AMATEUR RADIO W/ SCANNING RECEIVER
Date Sample Received	3/10/2015
Date Tested	3/25/2015
Tested By	Sid Sanders
Approved By	Cory Leverett
Test Results	☒ PASS ☐ FAIL

Report Number	Version Number	Description	Issue Date
478AUT15TestReport.docx	Rev.1	Initial Issue	3/27/2015

TABLE OF CONTENTS

GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

Summary

The device under test does:

☒ fulfill the general approval requirements as identified in this test report
☐ not fulfill the general approval requirements as identified in this test report

Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025: 2005 requirements.

I attest that the necessary measurements were made, under my supervision, at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, Fl 32669

Authorized Signatory Name:

Compliance Engineer

Date: 3/27/2015

REPORT SUMMARY PAGE

REPORT

Disclaimer	The test results only relate to the item tested.
Standards Applied Rule(s)	CFR 47 FCC Pt 15.109, Pt 15.107, ANSI C63.4: 2003
Related Report	NA

ENVIRONMENT

Test Facility	Timco Engineering, Inc. 849 NW State Road 45 Newberry, FL 32669 USA.
Test Condition in the laboratory	Temperature: 24-26ºC Relative humidity: 50-65% Barometric Pressure:

SETUP

Test Setup Diagram/ Description	The EUT was placed on the turntable per setup per ANSI C63.4: 2003. A test set up photo is provided for clarification.
Deviation from the standard/procedure	No deviation
Revision History of EUT	No modification

RESULTS

15.109 Radiated Emissions	PASS
15.107 Powerline Conducted Emissions	NA
15.121(b) 38 dB Rejection Ratio	PASS

TABLE OF CONTENTS

GENERAL INFORMATION

The test results relate only to the items tested.	
EUT Description	AMATEUR RADIO W/ SCANNING RECEIVER
FCC ID	K6620485X40
Model Number	FTM-100DR
EUT Power Source	☐ 110–120Vac/50– 60Hz
	☒ DC Power
	☐ Battery Operated Exclusively
Test Item	☐ Prototype
	☒ Pre-Production
	☐ Production
Modifications to EUT	None
Test Standards	FCC Part 15, Subpart B, ANSI C63.4-2003

TEST PROCEDURE

General: This report shall NOT be reproduced except in full without the written approval of TIMCO ENGINEERING, INC.

Radiation Interference: The test procedure used was ANSI C63.4-2003 using a spectrum analyzer with a pre-selector. The bandwidth of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The video bandwidth was always greater than or equal to the RBW.

Formula of Conversion Factors: The field strength at 3 m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBµV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the spectrum analyzer Meter Reading.

Example:

Freq (MHz)	Meter Reading	+ ACF	+CL	= FS
33	20 dBµV	+ 10.36 dB/m	+0.40 dB	=30.76 dBµV/m @ 3m

ANSI C63.4-2003 Section 10.1.7 Measurement Procedures: The unit under test was placed on a table 80 cm high and with dimensions of 1 by 1.5 meters. The table used for radiated measurements is capable of continuous rotation. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1 to 4 meters. The antenna was placed in both the horizontal and verticals planes.

If power line conducted testing was required for this device, the situation was similar for the conducted measurement except that the table did not rotate. The EUT was setup as described in ANSI C63.4-2003 with the EUT 40 cm from the vertical ground wall.

RADIATED SPURIOUS EMISSIONS

Rules Part No.: 15.109

Requirements:

Frequency	Limits
30 – 88	40.0 dBµV/m measured @ 3 meters
80 – 216	43.5 dBµV/m measured @ 3 meters
216 – 960	46.0 dBµV/m measured @ 3 meters
Above 960	54.0 dBµV/m measured @ 3 meters

Test Procedure: The procedure used was ANSI C63.4-2003. The frequency was scanned from 30 MHz to 1 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. The EUT was measured in three (3) orthogonal planes.

Test Data:

The EUT was test on 108.5, 440.3 & 998.5 MHz and the were no emissions within 20dB of the limit.

POWER LINE CONDUCTED INTERFERENCE

Rules Part No.: Part 15.107

Requirements:

Frequency (MHz)	Quasi Peak Limits (dBµV)	Average Limits (dBµV)
0.15 – 0.5	66 – 56	56 – 46
0.5 – 5.0	56	46
5.0 – 30	60	50

Test Procedure: ANSI Standard C63.4-2003. The spectrum was scanned from 0.15 to 30 MHz.

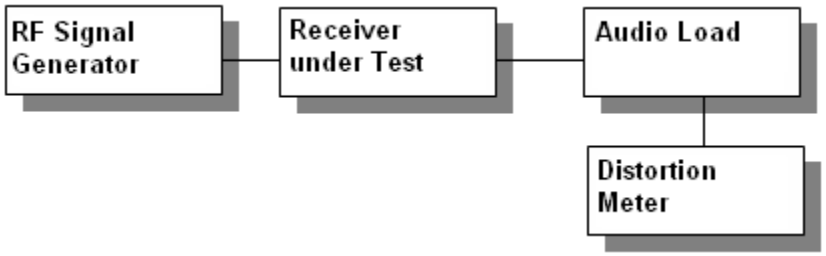
Test Data: **Not applicable EUT is battery powered.**

38 dB REJECTION RATIO

RULES PART NUMBER: 15.121(b)

REQUIREMENTS: 38 dB REJECTION RATIO TO SENSITIVITY OF THE RECEIVER.

TEST SET-UP



a. Equipment connected as illustrated
b. A standard signal was applied to the receiver input terminals.
c. Receiver output audio output was adjusted for rated output.
d. The RF Signal generator was adjusted to the lowest level to produce a 12 dB SINAD without the audio output dropping more than 3 dB. Make note of sensitivity level.
e. This was done across the different bands to establish a reference level. The reference taken was the worse case sensitivity.
f. The output of the signal generator was then adjusted to a level of 60 dB above the reference level at a frequency of 824.5MHz.
g. With the level set 60 dB above the level measured in step e.
h. Set squelch on receiver to threshold, the signal level required to open the squelch must be lower than the level measured in step d.
i. Cause the receiver to scan or step-it through its complete range of frequencies.
j. If receiver stops or unsquelches on any frequency, record the frequency and then adjust the level until a 12 dB SINAD is produced. This level must be greater than 38 dB above the level in step e.
k. Repeat steps f through j for frequencies 836.0, 848.5, 869.1, 881.0, & 893.5MHz.

TEST RESULTS: The EUT meets the 38 dB REJECTION RATIO.

TEST EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Antenna: Biconnical Chamber	Eaton Chamber	94455-1	1057	06/14/13	06/14/15
Antenna: Log-Periodic Chamber	Eaton	96005	1243	05/31/13	05/31/15
LISN	Electro-Metrics	ANS-25/2	2604	01/07/14	01/07/16
LISN (Primary)	Electro-Metrics	EM-7820	2682	02/26/13	02/26/15
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	12/31/13	12/31/15
Antenna: Double-Ridged Horn/ETS Horn 2	ETS-Lindgren	3117	00041534	02/25/15	02/25/17
EMI Test Receiver R & S ESIB 40 Screen Room	Rohde & Schwarz	ESIB 40	100274	08/12/14	08/12/16
Software: Field Strength Program	Timco	N/A	Version 4.0	N/A	N/A
EMI Test Receiver R & S ESU 40 Chamber	Rohde & Schwarz	ESU 40	100320	03/11/14	03/11/16

***EMI RECEIVER SOFTWARE VERSION**

The receiver firmware used was version 4.43 Service Pack 3