TIMCO ENGINEERING, Inc.

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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:	K6620533X20
Model Number	FT-252
Product Description	VHF AMATEUR RADIO WITH SCANNING RECEIVER
Date Sample Received	2/6/2013
Date Tested	2/7/2013
Tested By	Nam Nguyen
Approved By	Nam Nguyen
Report Number	244AUT13TestReport.doc
Test Results	☒ PASS ☐ FAIL

ACCREDITED
Certificate # 0955-01

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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.

ACCREDITED

Testing Certificate # 0955-01

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:

Nam Nguyen
Testing Technician

Date: February 11, 2013

GENERAL INFORMATION

The test results relate only to the items tested.	
DUT Description	VHF AMATEUR RADIO WITH SCANNING RECEIVER
FCC ID	K6620533X20
Model Number	FT-252
Frequency range	136 – 174 MHz
DUT Power Source	☐ 110–120Vac/50– 60Hz
	☐ DC Power
	☒ Battery Operated Exclusively
Test Item	☐ Prototype
	☒ Pre-Production
	☐ Production
AC ADAPTER	Model: PA-48B Input: 100 – 240V, 50/60 Hz, 0.3A Output: 12.0VDC, 0.5A
Modifications to DUT	None
Test Standards	FCC Part 15, Subpart B, ANSI C63.4-2003

TEST EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	12/31/11	12/31/13
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	10/28/11	10/28/13
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	10/28/11	10/28/13
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	10/28/11	10/28/13
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	10/28/11	10/28/13
Antenna: Biconnical	Eaton	94455-1	1096	05/04/11	05/04/13
Antenna: Biconnical	Electro-Metrics	BIA-25	1171	06/13/12	06/13/14
Antenna: Log-Periodic	Electro-Metrics	LPA-25	1122	05/04/11	05/04/13
LISN	Electro-Metrics	ANS-25/2	2604	10/28/11	10/28/13
Signal Generator	HP	8640B	2308A21464	02/23/12	02/23/14

TEST PROCEDURE

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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 3m 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 1mby 1.5m. 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 1m to 4m. 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 5th Harmonic. When an emission was found, the table was rotated to produce the maximum signal strength. The EUT was measured in three (3) orthogonal planes if required.

Test Data: The data represents the noise floor as there were no significant emissions found.

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
136.0	106.70	5.2	H	0.66	10.46	16.32	27.18
136.0	166.30	4.9	V	0.77	16.32	21.99	21.51
136.0	368.40	6.3	H	1.17	15.27	22.74	23.26
136.0	368.40	6.4	V	1.17	15.27	22.84	23.16
136.0	448.20	6.9	H	1.25	17.52	25.67	20.33
136.0	717.80	6.6	V	1.74	21.86	30.20	15.80
162.5	62.00	5.2	H	0.54	6.78	12.52	27.48
162.5	78.30	6.4	V	0.59	7.66	14.65	25.35
162.5	216.60	5.9	H	0.93	11.84	18.67	27.33
162.5	286.20	5.9	V	1.07	15.12	22.09	23.91
162.5	448.20	6.6	H	1.25	17.52	25.37	20.63
162.5	469.40	6.5	V	1.27	17.69	25.46	20.54
174.0	107.20	5.3	H	0.66	10.42	16.38	27.12
174.0	166.00	5.1	V	0.76	16.36	22.22	21.28
174.0	343.40	6.0	H	1.14	15.00	22.14	23.86
174.0	343.40	7.4	V	1.14	15.00	23.54	22.46
174.0	448.20	7.8	H	1.25	17.52	26.57	19.43

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 C63.4-2003. The spectrum was scanned from 0.15 to 30 MHz.

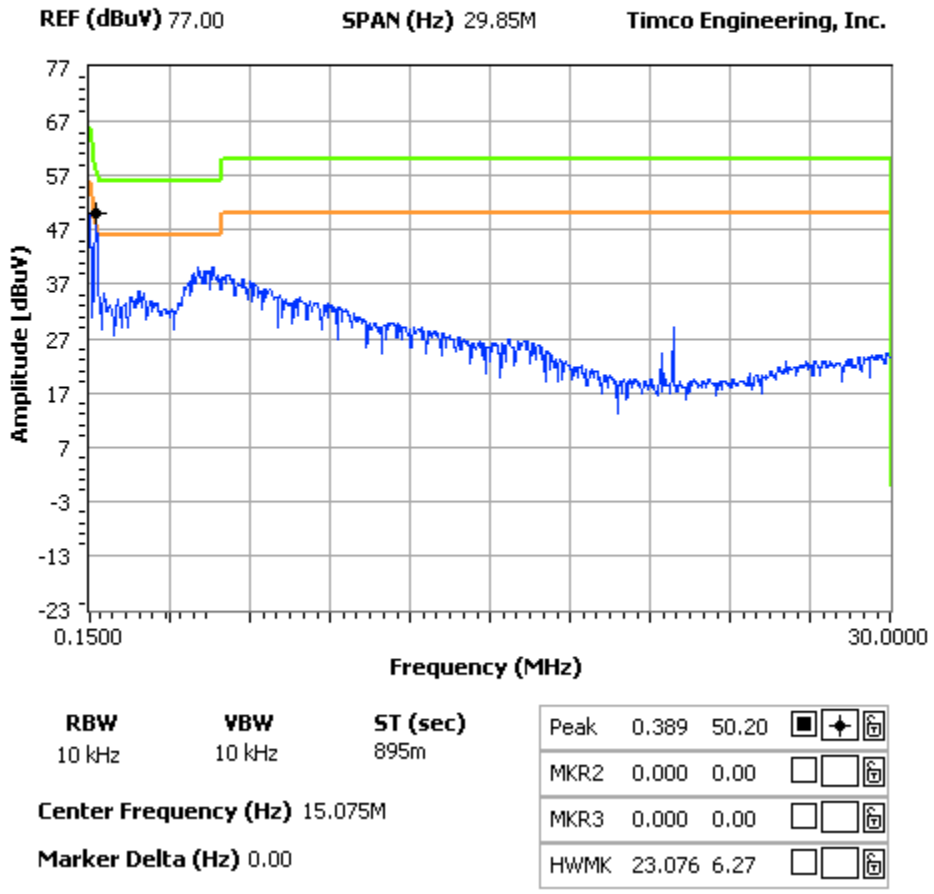
Test Data: The attached graphs represent the emissions read for power line conducted. Both lines were observed.

POWERLINE CONDUCTED EMISSIONS – LINE 1

NOTES:

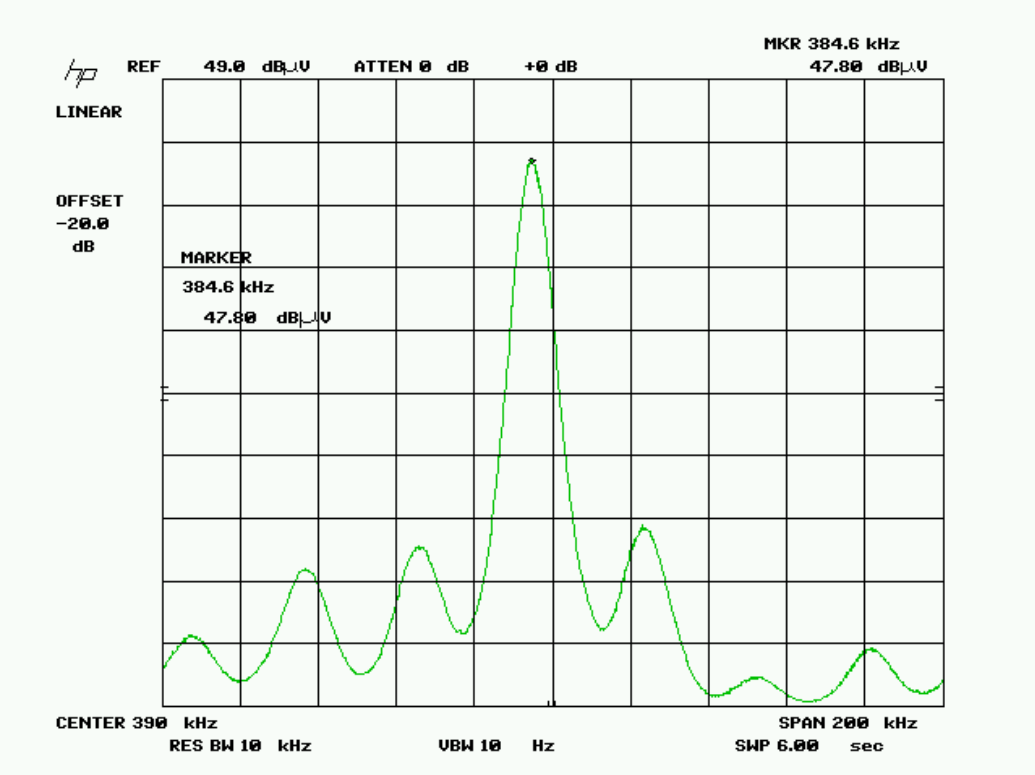
YAESU MUSEN CO., LTD. - MODEL NUMBER: FT-252
POWERLINE CONDUCTED PLOT - LINE 1

FCC 15.107 Mask Class B

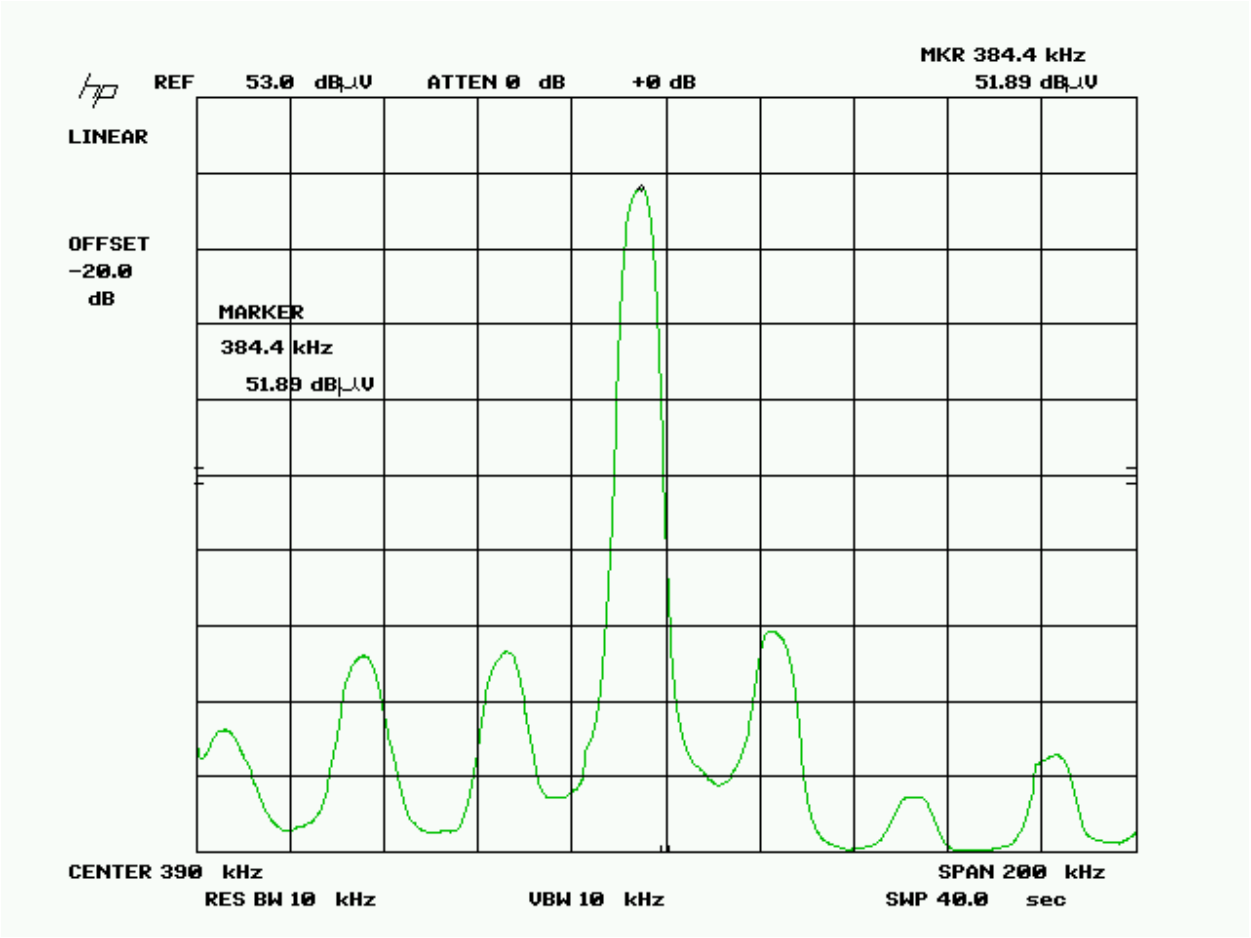


The limit at 0.389 MHz: 48.09 dBµV (Avg) and 58.09 dBµV (Quasi peak)

POWERLINE CONDUCTED EMISSIONS – LINE 1(AVERAGING)



POWERLINE CONDUCTED EMISSIONS – LINE 1(QUASI PEAK)

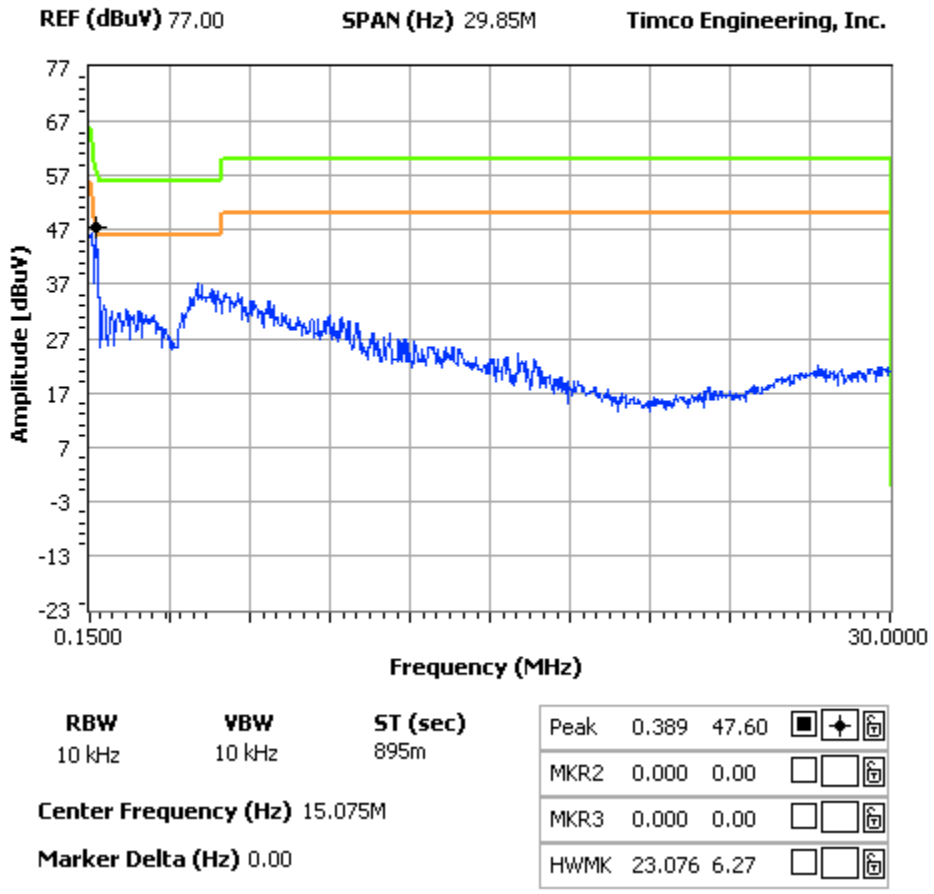


POWERLINE CONDUCTED EMISSIONS – LINE 2

NOTES:

YAESU MUSEN CO., LTD. - MODEL NUMBER: FT-252
POWERLINE CONDUCTED PLOT - LINE 2

FCC 15.107 Mask Class B



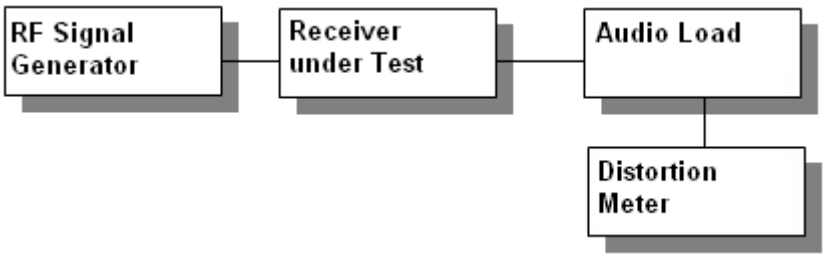
The limit at 0.389 MHz: 48.09 dBµV (Avg) and 58.09 dBµV (Quasi peak)

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 60dB 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 12dB SINAD is produced. This level must be greater than 38dB 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.

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