849 NW STATE ROAD 45
NEWBERRY, FL 32669 USA
PH: 888.472.2424 OR 352.472.5500
FAX: 352.472.2030
EMAIL: INFO@TIMCOENGR.COM
HTTP://WWW.TIMCOENGR.COM

FCC PART 95 SUBPART D

TEST REPORT

FOR CB TRANSCEIVERS

APPLICANT	RANGER ELECTRONIC COMMUNICATIONS, INC.
	70 PEI NEI STREET SHULIN TAIPEI HSIEN 238 TAIWAN
FCC ID	C2R-PPR-125
MODEL NUMBER	PPR-125
PRODUCT DESCRIPTION	AM 40 CH CB TRANSCEIVER
DATE SAMPLE RECEIVED	1/23/2008
DATE TESTED	2/11/2008
TESTED BY	NAM NGUYEN
APPROVED BY	MARIO DE ARANZETA
TIMCO REPORT NO.	181AUT8TestReport.doc
TEST RESULTS	☒ PASS ☐ FAIL

ACCREDITED
Testing Certificate # **0955-01**

TABLE OF CONTENTS

GENERAL REMARKS

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

The test results relate only to the items tested.

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 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:

Mario de Aranzeta C.E.T.
Compliance Engineer/ Lab. Supervisor

Date: 2/13/2008

GENERAL INFORMATION

DUT Specification

DUT Description	CB TRANSCEIVER
FCC ID	C2R-PPR-125
Model Number	PPR-125
Serial Number	N/A
Operating Frequency	26.965-27.405 MHz
No. of Channels	40
Type of Emission	6KOOA3E Bn = 2M M = 3000 Bn = 6000
Modulation	AM
DUT Power Source	☐ 110–120Vac/50– 60Hz
	☒ DC Power
	☐ Battery Operated Exclusively
Test Item	☐ Prototype
	☒ Pre-Production
	☐ Production
Type of Equipment	☐ Fixed
	☒ Mobile
	☐ Portable

TEST ENVIRONMENT

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

TEST SETUP SUMMARY

Test Setup Diagram/ Description	The DUT 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
Modification of DUT	No modification
Applicable Standards	EIA/TIA-382-A, FCC CFR 47 PART 95

EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/20/07	3/19/10
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	Listed 5/11/07	5/10/10
Antenna: Biconnical	Eaton	94455-1	1096	CAL 10/11/06	10/11/08
Analyzer Blue Tower Quasi-Peak Adapter	HP	85650A	2811A01279	CAL 5/17/07	5/17/09
Analyzer Blue Tower RF Preselector	HP	85685A	2926A00983	CAL 5/17/07	5/17/09
Analyzer Blue Tower Spectrum Analyzer	HP	8568B	2928A04729 2848A18049	CAL 5/17/07	5/17/09
LISN	Electro-Metrics	ANS-25/2	2604	CAL 10/5/06	10/5/08
Antenna: Log-Periodic	Electro-Metrics	LPA-25	1122	CAL 12/1/06	12/1/08
Receiver	Rohde&Schwarz	ESIB 40		1/10/08	1/10/10

TEST PROCEDURE

Power Line Conducted Interference: The procedure used was EIA/TIA-382-A using a 50uH LISN. Both lines were observed with the UUT transmitting. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

Bandwidth 20 dB: The measurements were made with the spectrum analyzer's resolution bandwidth (RBW) = 1 MHz and the video bandwidth (VBW) = 3 MHz and the span set as shown on plot.

Power Output: The RF power output was measured at the antenna feed point using a peak power meter.

Antenna Conducted Emissions: The RBW = 100 kHz, VBW = 300 kHz and the span set to 10.0 MHz and the spectrum was scanned from 30 MHz to the 10th Harmonic of the fundamental. Above 1 GHz the resolution bandwidth was 1 MHz and the VBW = 3 MHz and the span to 50 MHz.

Radiation Interference: The test procedure used was EIA/TIA-382-A using an Agilent spectrum receiver with pre-selector. The bandwidth (RBW) of the spectrum EIA/TIA-382-A receiver was 100 kHz up to 1 GHz and 1 MHz above 1 GHz with an appropriate sweep speed. The VBW above 1 GHz was 3 MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

RF POWER OUTPUT

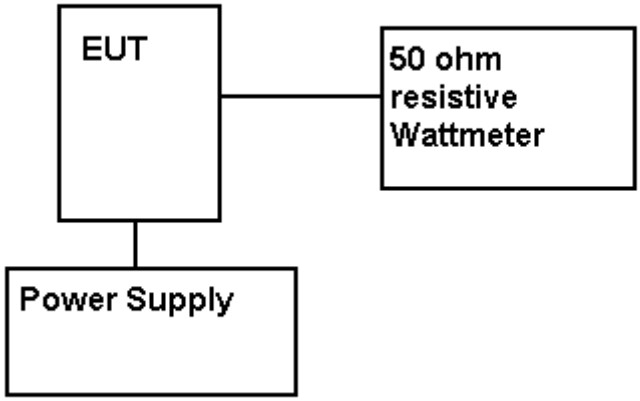
Rule Part No.: Part 2.1033(c), Part 95

Test Requirements:

Method of Measurement: RF power is measured by connecting a 50-ohm, resistive wattmeter to the RF output connector. With a nominal battery voltage, and the transmitter properly adjusted the RF output measures:

Test Data: OUTPUT POWER: HIGH – 4 Watts

Test Setup Diagram:



Part 2.1033 (C)(8) DC Input into the final amplifier

INPUT POWER: (13.8V)(0.72A) = 9.94 Watts

MODULATION CHARACTERISTICS

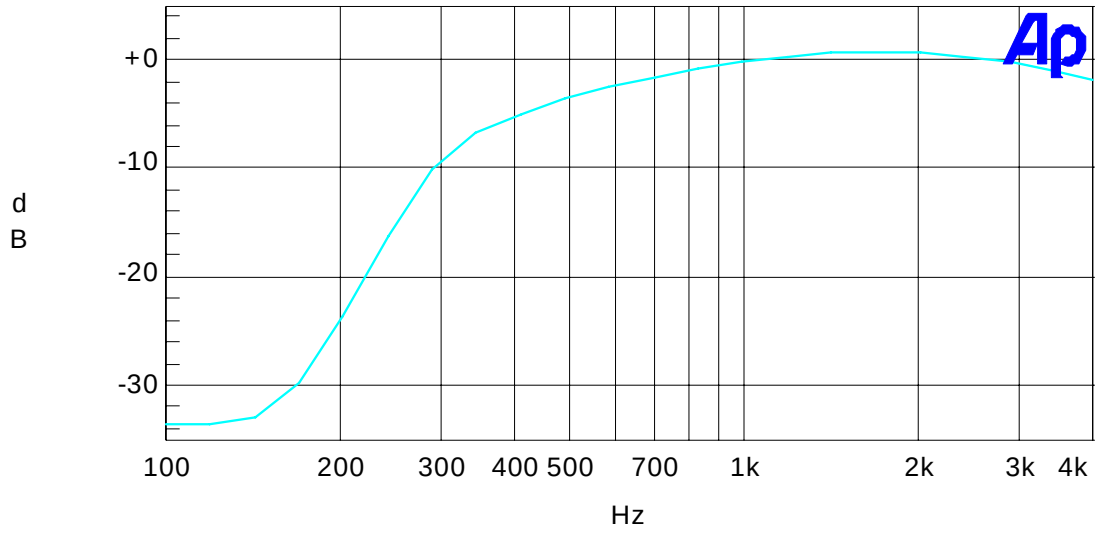
AUDIO FREQUENCY RESPONSE

Rule Part No.: Part 2.1047(a)(b)

Method of Measurement:

The audio frequency response was measured in accordance with EIA/TIA-382-A with no exception. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 – 5000Hz shall be submitted. The audio frequency response curve is shown below.

Audio Frequency Response Plot



Color	Line Style	Thick	Data	Axis
Cyan	Solid	1	Anlr.Level A!Normalize	Left

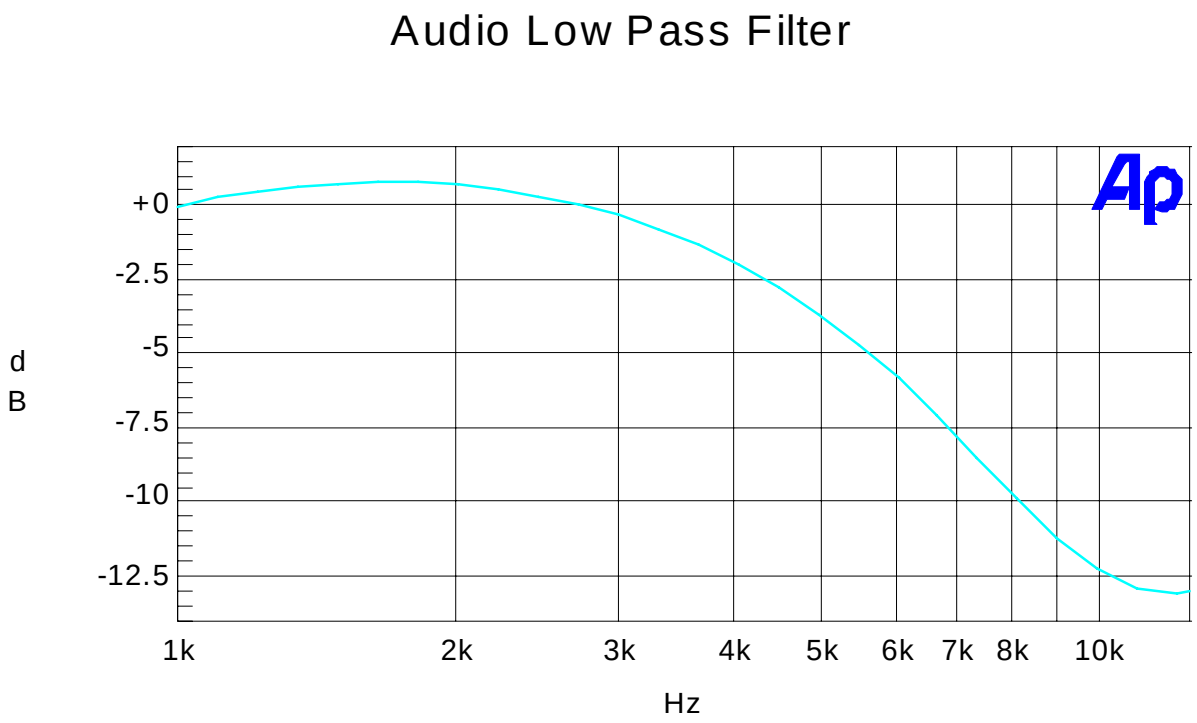
MaxFreq.at1

AUDIO LOW PASS FILTER RESPONSE

Rule Part No.: Part 2.1047(a)(b)

Required for voice modulated communication equipment

For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all the circuitry installed between the modulation limiter and the modulated stage shall be submitted.



Color	Line Style	Thick	Data	Axis
Cyan	Solid	1	Anlr.Level A!Normalize	Left

MaxFreq.at1

AUDIO INPUT VS MODULATION

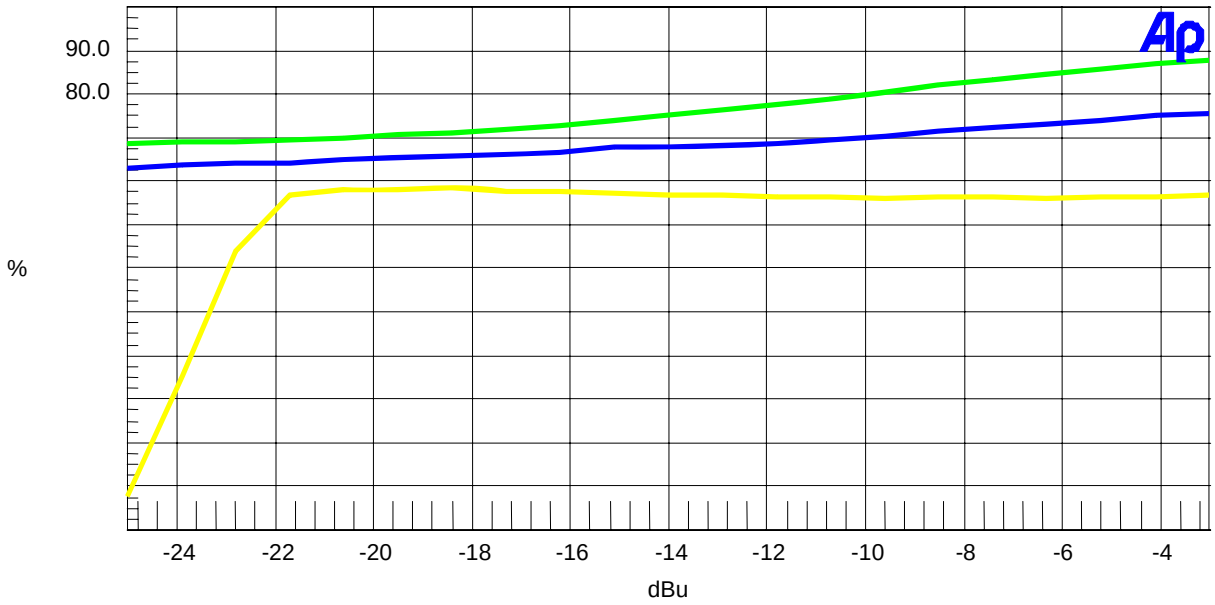
Rule Part No.: Part 2.1047(a)(b)

Test Requirements: Modulation cannot exceed 100%

Method of Measurement: The audio input level needed for a particular percentage of modulation was measured in accordance with EIA/TIA-382-A. The audio input curves versus modulation are shown below. Curves are provided for audio input frequencies of 300, 1000, and 3000 Hz.

Test data:

Modulation Limiting Plots: 2.5 KHz (Green), 1.0 KHz (Blue), and 300 Hz (Yellow)



Color	Line Style	Thick	Data	Axis
Yellow	Solid	3	Anlr.Level A	Left
Blue	Solid	3	Anlr.Level A	Left
Green	Solid	3	Anlr.Level A	Left

modulation limiting.at1

OVER MODULATION TRANSIENT RESPONSE

A. MEASUREMENT PROCEDURE

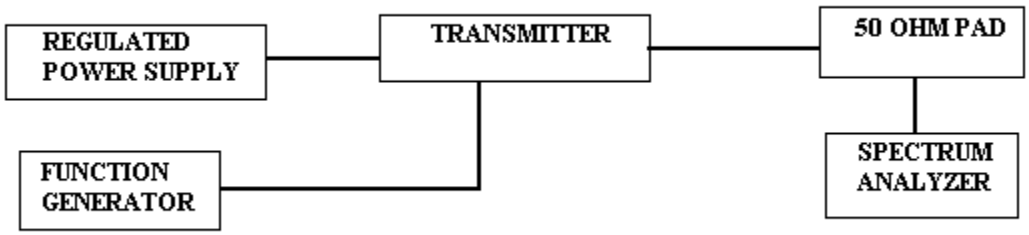
1. Set audio modulating signal at 2500Hz, at a level 16dB greater than required for 50% modulation at audio frequency of maximum response. This signal is pulsed at one (1) P.P.S. with a pulse width of 0.5sec.

2. Tune the Spectrum Analyzer to the channel on which channel on which the transmitter is set and adjust the settings as for the measurement of occupied bandwidth.

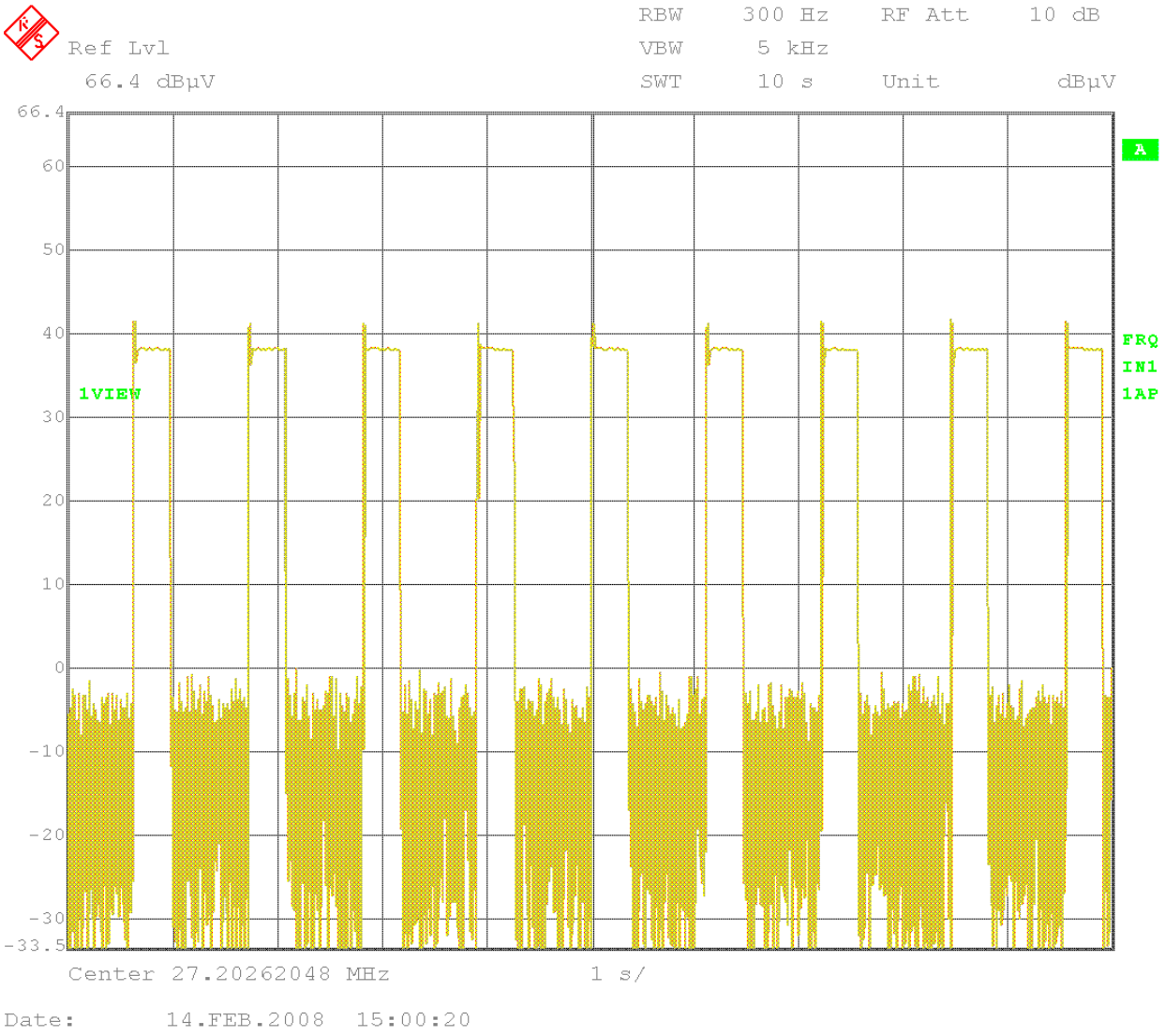
3. Then tune the Spectrum analyzer to the adjacent channel (+,-10 kHz) to that on which the transmitter is set, place it in the "ZERO-SCAN", then observe the transients caused by the pulsed modulation.

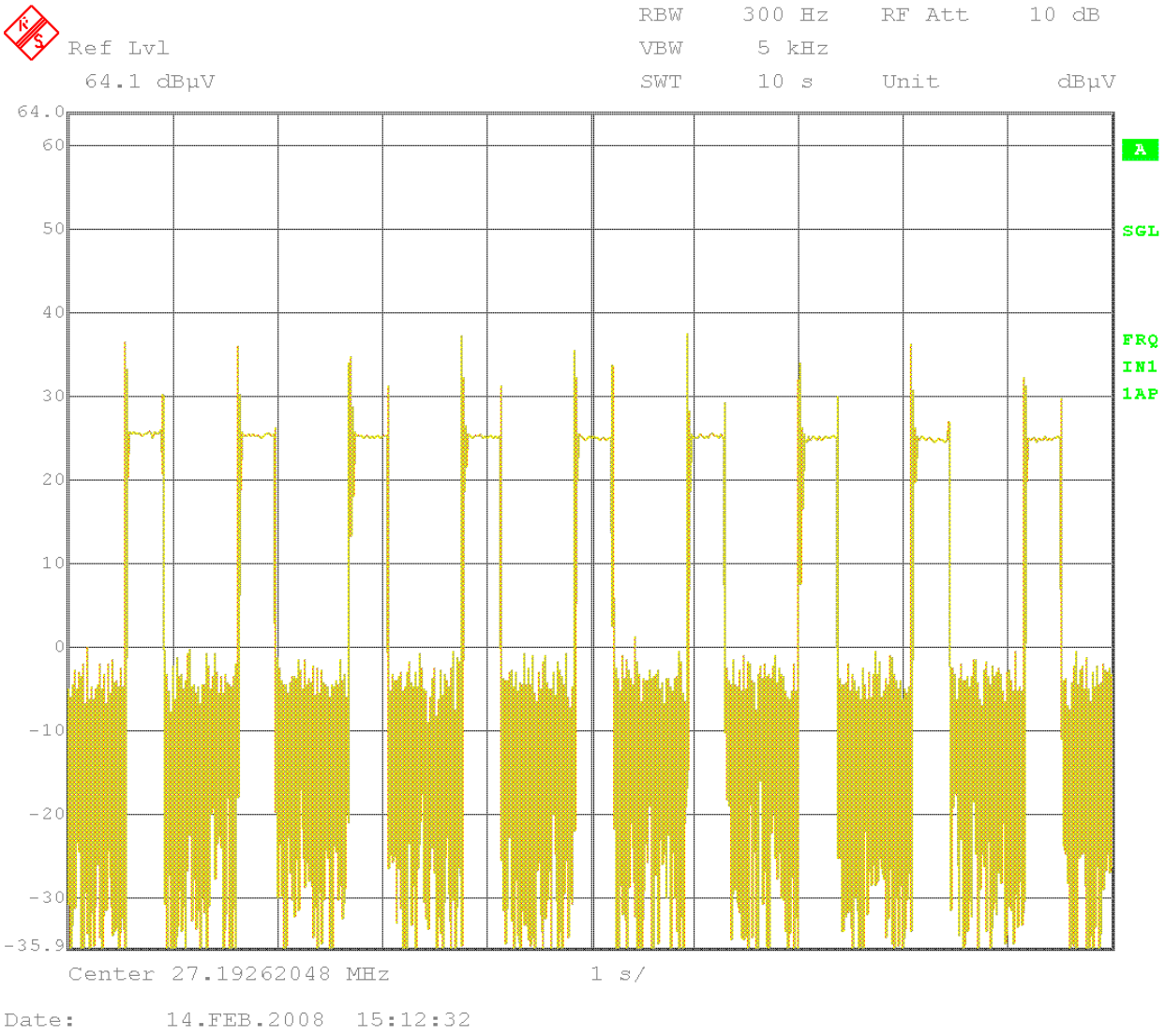
4. The transients must have a duration of less than 100 milliseconds and be attenuated by at least 26 dB.

B. TEST SET UP



Results: Transmitter meets the requirements. See the following plots.


RBW 300 Hz
RF Att 10 dB
Ref Lvl
VBW 5 kHz
66.4 dBµV
SWT 10 s
Unit dBµV
66.4
60
50
40
30
20
10
0
-10
-20
-30
-33.5
A
FRQ
IN1
1AP
1VIEW
Center 27.20262048 MHz
1 s/
Date: 14.FEB.2008 15:00:20


RBW 300 Hz
RF Att 10 dB
Ref Lvl
VBW 5 kHz
64.1 dBµV
SWT 10 s
Unit dBµV
64.0
60
50
40
30
20
10
0
-10
-20
-30
-35.9
A
SGL
FRQ
IN1
1AP
Center 27.19262048 MHz
1 s/
Date: 14.FEB.2008 15:12:32

OCCUPIED BANDWIDTH

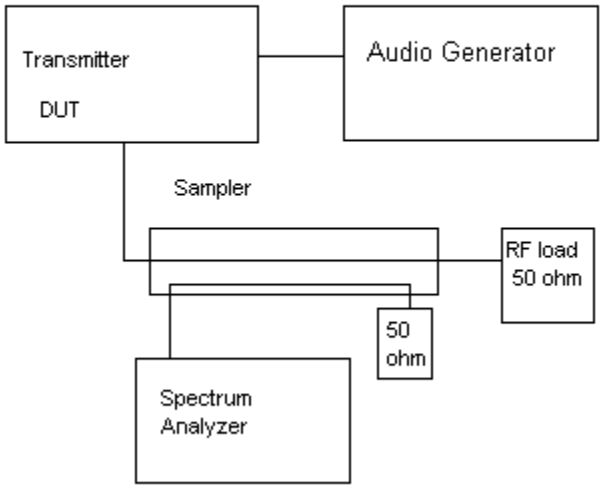
2.1049

95.631(c) Data in the plots shows that the sidebands from greater than 50% to 100% of the authorized bandwidth must be attenuated by at least 25dB and from 100 to 250% the sidebands must be attenuated by at least 35dB. Beyond 250% the sidebands must be attenuated by at least 53+ 10log (TP). The transmitter was modulated with 2500 Hz, adjusted for 50% modulation plus 16 dB. The spectrum analyzer was set with the un-modulated carrier at the top of the screen. The test procedure diagram and occupied bandwidth photographs follow.

Radiotelephone transmitter with modulation limiter.

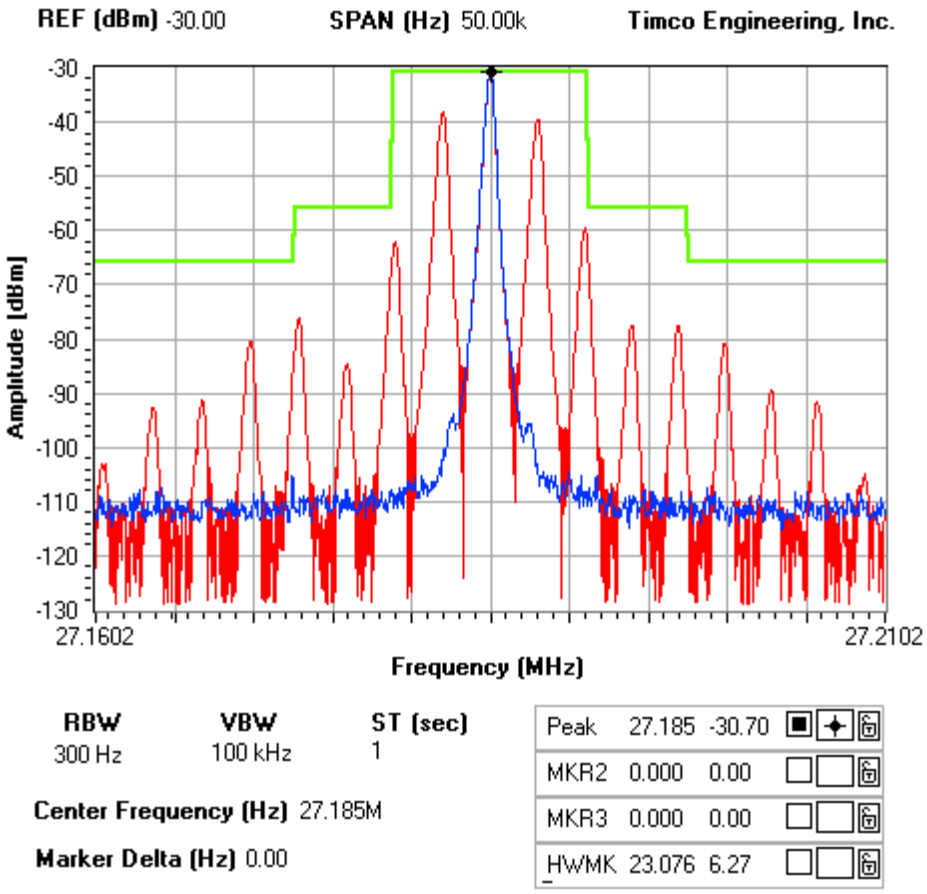
Test procedure diagram

Occupied BW Test Equipment Setup



NOTES:

RANGER ELECTRONIC COMMUNICATIONS, INC. - FCC ID: C2RPPR-125
OCCUPIED BANDWIDTH PLOT



SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

Rule Part No.: Part 2.1051(a)

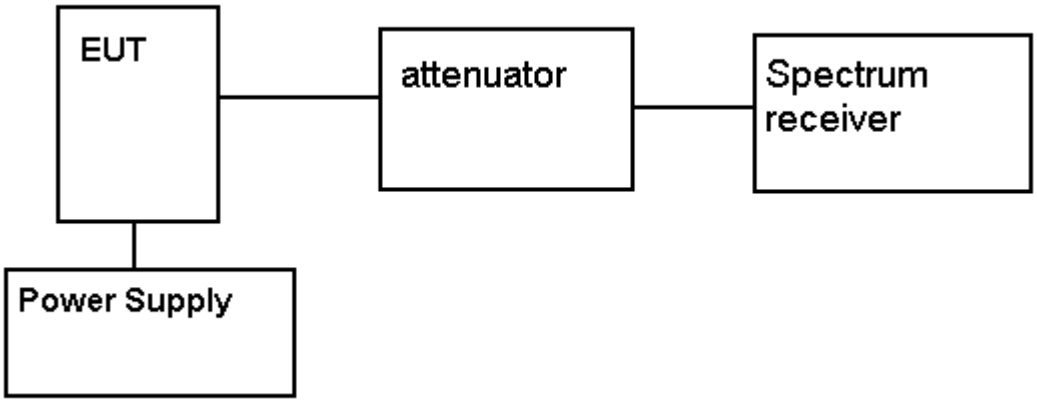
Requirements: 53+ 10log (TP) = 59.0dB. Any emissions above 54 MHz must be 60 dBc.

Method of Measurement: The carrier was modulated 100% using a 2500 Hz tone. The spectrum was scanned from 0.4 to at least the 10th harmonic of the fundamental. The measurements were made in accordance with standard EIA/TIA-382-A.

Test Data:

TF	EF	dB below carrier
27.19	27.19	
	54.37	74.1
	81.56	80.5
	108.74	81.1
	135.93	78.7
	163.11	68.8
	190.30	67.7
	217.48	81.8
	244.67	84.8
	271.85	78.1

Method of Measuring Conducted Spurious Emissions



METHOD OF MEASUREMENT: The procedure used was EIA/TIA-382-A.

FIELD STRENGTH OF SPURIOUS EMISSIONS

Rule Parts. No.: Part 2.1053, 95.635(b)(8)(9)

Requirements: Emissions must be attenuated by at least the following below the output of the transmitter.

53 + 10log(4.00) = 59.0 dB or
FCC Limit for**:** 8kHz Authorized BW

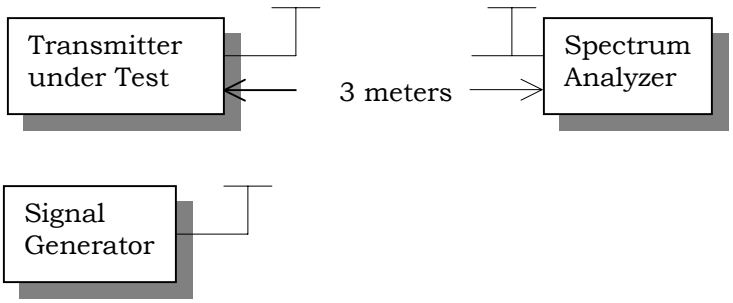
At least 53+10Log(T) dB on any frequency removed from the center of the authorized bandwidth by more than 250%. At least 60dB on any frequency twice or greater than twice the fundamental.

Test Data:

Emission Frequency MHz	Ant. Polarity V/H	dBc
27.19	0	0
54.37	H	80.45
81.56	H	88.17
108.74	H	83.27
135.93	H	83.17
163.11	H	68.87
190.30	H	61.36
217.48	H	72.71
244.67	H	72.54
271.85	H	64.47

METHOD OF MEASUREMENT: The tabulated data shows the results of the radiated field strength emissions test. The spectrum was scanned from 30 MHz to at least the tenth harmonic of the fundamental. This test was conducted per EIA/TIA-382-A using the substitution method. Measurements were made at the test site of TIMCO ENGINEERING, INC. located at 849 NW State Road 45, Newberry, FL 32669.

Test Setup Diagram:



FREQUENCY STABILITY

2.1055(a)(b)(d)

Temperature and voltage tests were performed to verify that the frequency remains within the .005%, 50 ppm specification limit. The test was conducted as follows: The transmitter was placed in the temperature chamber at 25 ºC and allowed to stabilize for one hour. The transmitter was keyed ON for one minute during which four frequency readings were recorded at 15-second intervals. The worse case number was taken for temperature plotting. The assigned channel frequency was considered to be the reference frequency. The temperature was then reduced to -30 ºC after which the transmitter was again allowed to stabilize for one hour. The transmitter was keyed ON for one minute, and again frequency readings were noted at 15-second intervals. The worst case number was recorded for temperature plotting. This procedure was repeated in 10 degree increments up to + 50 ºC.

Readings were also taken at ±15% of the battery voltage of 13.8 VDC.

Test Data:

Assigned Frequency (Ref. Frequency) (MHz)		27.064985
Temperature (ºC)	**Frequency (MHz)**	**Frequency Stability (PPM)**
-30	27.064834	-5.58
-20	27.064893	-3.40
-10	27.064993	0.30
0	27.065040	2.03
+10	27.065032	1.74
+20	27.064998	0.48
+30	27.064955	-1.11
+40	27.064936	-1.81
+50	27.064954	-1.15

Assigned Frequency (Ref. Frequency) (MHz)		27.064 985
% Battery	**Frequency (MHz)**	**Frequency Stability (PPM)**
-15%	27.064997	0.44
0	27.064985	0.00
+15%	27.065000	0.55

20 ºC and at 85% of the battery. Endpoint 11.73V/dc 27.064 997 0.44