



**MEASUREMENT TECHNICAL REPORT FOR**  
**Ten-Tec, Inc.**  
**1185 Dolly Parton Parkway**  
**Sevierville, TN 37862**

**MODEL: RX400**

**ADDITIONAL MODELS: None**

**REPORT NUMBER: G809170Rev1**

Revision: Added FCC15.121 test data

**Report Date: September 24, 2008**

**Revision Date: November 3, 2008**

**Date Test Sample Received: September 10, 2008**

**This report concerns: FCC Rules Part 15 (2007)**

**Test report was prepared by and test performed at:**

**GLOBAL TESTING LABORATORIES, LLC**  
**3029 East Governor John Sevier Highway**  
**Knoxville, Tennessee 37914-6424**

**Written By**

**Cailé Gonzalez**  
**Office Manager**

**September 24, 2008**

**Date**

**Reviewed By**

**Derick Seay**  
**EMC Manager**

**November 3, 2008**

**Date**

**Approved By**

**Roger Williams**  
**Senior Mgr. Engineering**

**November 3, 2008**

**Date**

<b>LIST OF EXHIBITS    REPORT # G809170</b>
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5.    Radiated Emissions (FCC Part 15)
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**SECTION 1**  
**SUMMARY OF RESULTS**  
**REPORT # G809170**

**This Test Report in no way constitutes or implies product certification, approval, or endorsement by NIST or any Government Agency and may not be used to imply such endorsement.**

The equipment used in this test provided a Test Uncertainty Ratio better than 4:1. Uncertainties are expressed at approximately 95% confidence level (k=2).

This report covers only the listed Model: RX400, which indicates that the previously mentioned equipment **MEETS, with modifications**, the requirements as set forth by the following standards:

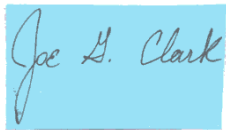
Conducted Emissions (FCC Part 15)

Radiated Emissions (FCC Part 15)

Immunity to Cellular Signals (FCC Part 15 Sect 15.121)\*

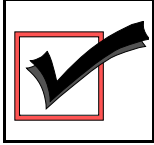
*\*added new firmware to pass Section 15.121*

Mass production of final instrument systems utilizing the exact electrical/ mechanical components, lead dress, and RF ground paths as tested by Global Testing Laboratories, LLC will not likely cause harmful interference to any radio communication, radio navigation or safety services. Any deviation in design from the system tested by our facility will require further verification of Compliance by Global Testing Laboratories, LLC. This test report is the confidential property of Ten-Tec. Extracts from this test report shall not be reproduced except in full without our written approval.



**Senior Manager Regulatory Affairs**  
**Global Testing Laboratories, LLC**

**SECTION 2  
ENGINEERING STATEMENT  
REPORT # G809170**



## **Engineering Statement**

All measurement data on the attached reports was taken pursuant to FCC Rules Part 15 by Global Testing Laboratories, LLC located in Knoxville, Tennessee. Although this data is taken under stringent laboratory conditions and to the best of our knowledge, represents accurate data, it must be recognized that emissions from this type of equipment may be greatly affected by the final installation of the equipment. Therefore, Global Testing Laboratories, LLC, while supporting the accuracy of the data in this report, takes no responsibility for use of equipment based on these tests. The manufacturer of this equipment must take full responsibility for any field problems, which may arise, and agrees that Global Testing Laboratories, LLC, in performing its functions in accordance with its objectives and purposes, does not assume or undertake to discharge any responsibility of the manufacturer to any other party or parties.

Testing on the Ten-Tec Model: RX400 was performed from September 10, 2008 through September 16, 2008, October 20, 2008 through October 22, 2008 and on October 28, 2008. The data contained within this technical report was compiled and approved by:

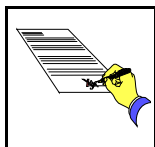
A handwritten signature in cursive script, reading "Cailé Gonzalez", is shown in a light gray rectangular box.

Cailé Gonzalez  
Global Testing Laboratories, LLC  
3029 East Governor John Sevier Highway  
Knoxville, Tennessee 37914-6424

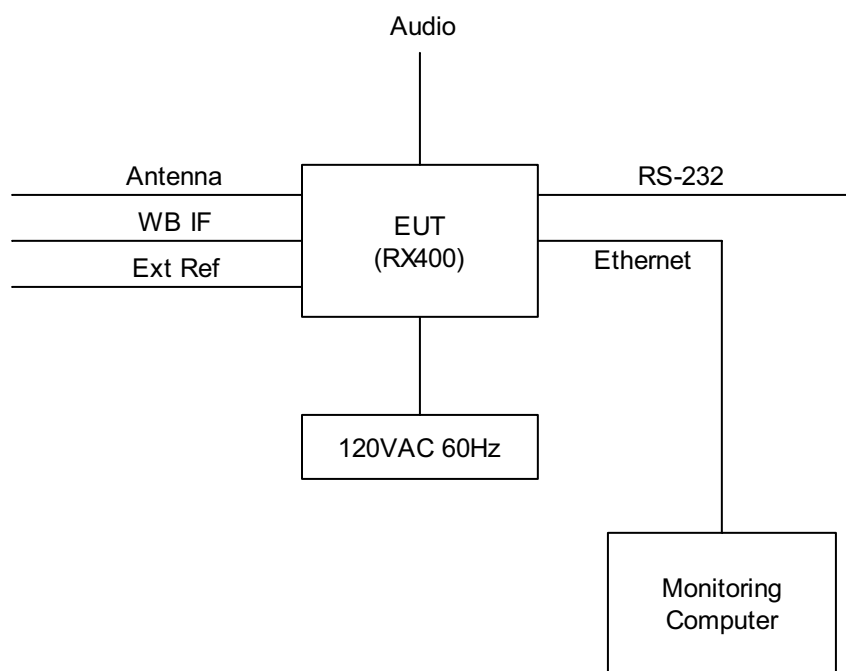
### SECTION 3

## SYSTEM TEST CONFIGURATION

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The **Ten-Tec Model: RX400** was configured into a simulated installation.



The specific setup for each test performed is described in the following Sections.

**SECTION 4**  
**CONDUCTED EMISSIONS**  
**REPORT # G809170**

**TEST PROCEDURE: FCC Part 15**

**ACRONYMS:**

(E.M.I.)      Electromagnetic Interference  
(E.U.T.)      Equipment Under Test  
(L.I.S.N.)    Line Impedance Stabilization Network

**CONDUCTED EMISSIONS:**

The (2) 50 ohm/50 micro-Henry LISN's were placed next to the EUT. For each test required, the AC power leads were connected to two (2) 50 ohm/50 micro-Henry L.I.S.N.s as described in section 9 Method of measurement of terminal interference voltage of EN 55022/ANSI C63.4. The system was energized and placed into its normal operating mode. The 50-ohm output of the L.I.S.N. was connected to the HP8568B RF Spectrum Analyzer. The EUT was observed from 148.5 kHz to 30 MHz to identify the frequency of the emission that had the highest amplitude relative to the limit. For each mode of operation and for each current carrying conductor, cable and/or wire manipulation was performed while observing the Spectrum Analyzer. For this series of tests the emission that had the highest amplitude relative to the limit was recorded. The EUT was powered by 120 VAC 60 Hz.

Based on the preliminary tests, the EUT and the cable and/or wire configuration and mode of operation which produced the highest emission relative to the limit was selected for the final AC power line conducted emissions test. The final test on all current carrying conductors of the power cords that comprise the EUT was performed without variation of the configuration determined during the preliminary tests. The X-Y plots of EMI generated by the E.U.T. were taken.

**Calibration:**

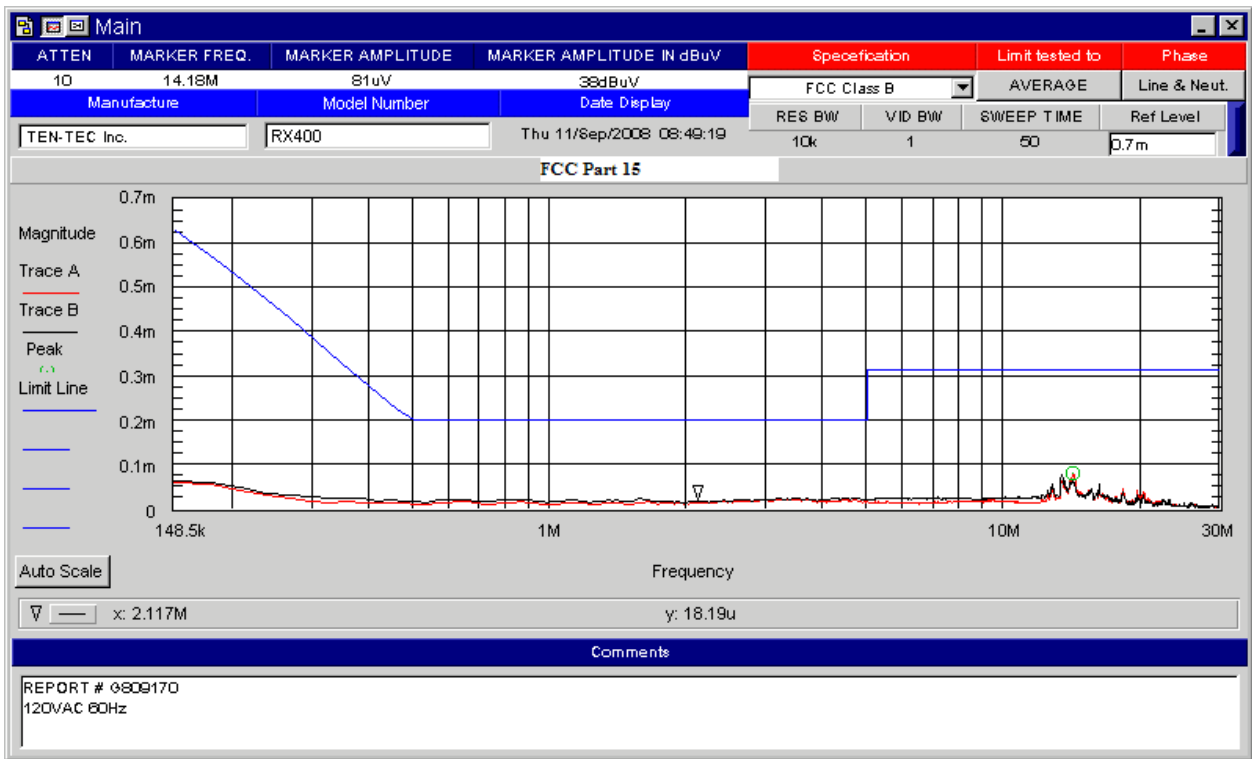
**Equipment Used During Testing:**

**Cal. Date:    Cal. Due:**

<b>1/15/08</b>	<b>4/15/09</b>	<b>HP 8568B</b>	<b>s/n: 2597</b>	<b>Spectrum Analyzer</b>
<b>1/15/08</b>	<b>4/15/09</b>	<b>HP 85650A</b>	<b>s/n: 1850</b>	<b>Quasi-Peak Adapter</b>
<b>4/10/08</b>	<b>4/10/09</b>	<b>HP 85685A</b>	<b>s/n: 0595</b>	<b>RF Pre-selector</b>
<b>6/23/08</b>	<b>6/23/09</b>	<b>Fisher 50Ω /50μH</b>	<b>s/n: 05 &amp; 06</b>	<b>LISN</b>

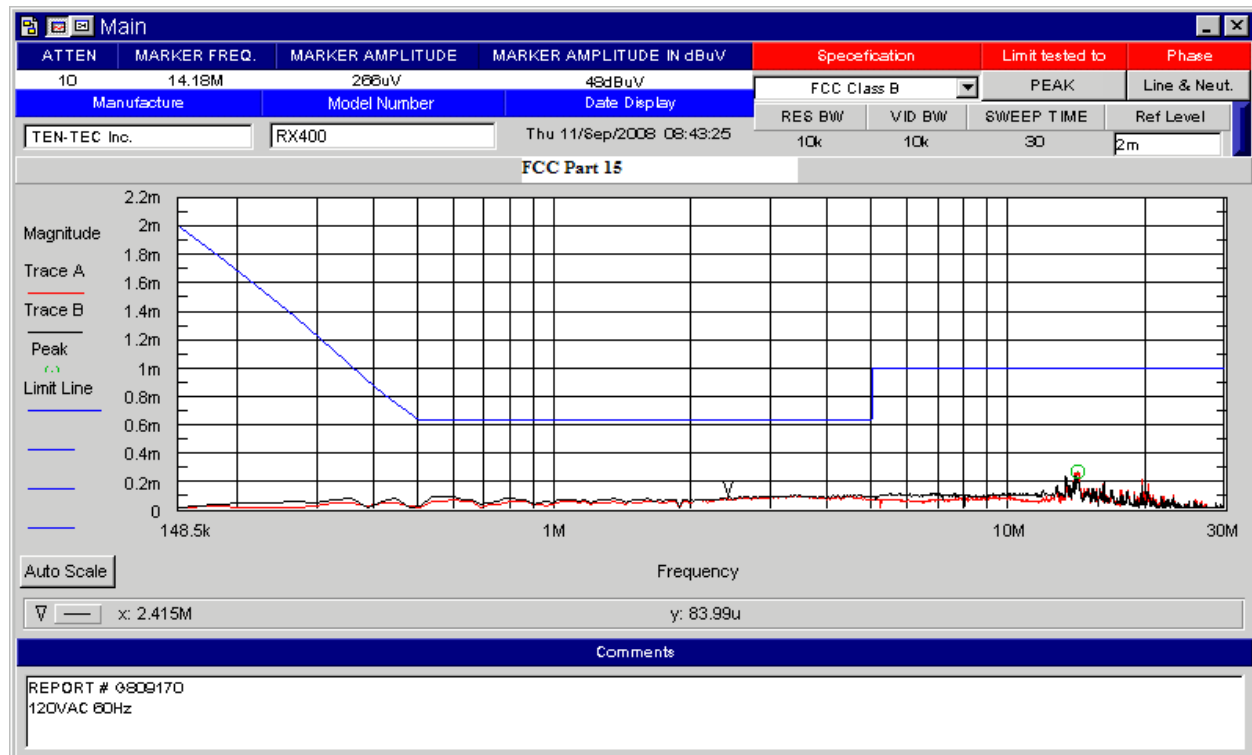
SUPPLEMENTAL DATA

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# SUPPLEMENTAL DATA

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**SECTION 5**  
**RADIATED EMISSIONS**  
**REPORT # G809170**

**TEST PROCEDURE: FCC Part 15**

The EUT was placed in a typical configuration approximately 0.8m above a metal turntable mounted level with the metal ground plane. A receiving Biconical antenna was placed 3 meters away from the EUT on a 4-meter fiberglass mast. The receiving antenna was connected to the 50  $\Omega$  input of the HP8566B spectrum analyzer. The EUT was powered by 120 VAC 60 Hz and was configured into its normal operational mode.

The 30 to 40 MHz band was observed on the spectrum analyzer while the EUT power and control leads were adjusted to maximize emissions. The peak frequencies for this band were recorded. This search for emissions continued from 40 MHz up to 15 GHz.

The receiving antennas were varied in height from 1 to 4 meters and the remote turntable was rotated 360 degrees to find the maximum emissions. This test was performed for all modes of operation.

All significant emissions are reported on the attached data report. To verify that the E.M.I. emissions measured were generated by the E.U.T., the system power was interrupted at peak reading while observing the Spectrum Analyzer. Unless otherwise specified, all Radiated Emissions are recorded as "PEAK" spectrum analyzer readings.

**When the PEAK reading exceeds the Limit, the QP is taken and recorded as dB $\mu$ v(QP).** The Radiated Field Strength was calculated as follows: Maximum Emission Received (dB) + Antenna Factor (dB) + Cable Loss (dB) = Field Strength dB $\mu$ v/Meter.

**Calibration:**

**Cal. Date: Cal. Due:**

**1/15/08 4/15/09**

**1/15/08 4/15/09**

**4/10/08 4/10/09**

**10/16/07 10/16/08**

**3/30/07 9/30/08**

**Equipment Used During Testing:**

<b>HP 8566B</b>	<b>s/n: 6612</b>	<b>Spectrum Analyzer</b>
<b>HP 85650A</b>	<b>s/n: 1001</b>	<b>Quasi-Peak Adapter</b>
<b>HP 85685A</b>	<b>s/n: 1176</b>	<b>RF Pre-selector</b>
<b>EMCO 3110</b>	<b>s/n: 1679</b>	<b>Biconical Antenna</b>
<b>EMCO 3146</b>	<b>s/n: 3974</b>	<b>Log-Periodic Antenna</b>

**SUPPLEMENTAL DATA****REPORT # G809170**

GLOBAL TESTING LABORATORIES, LLC  
3029 GOV. JOHN SEVIER HWY.  
KNOXVILLE, TENNESSEE 37914  
TEL:(865)523-9972 FAX:(865)637-7598

**OPEN FIELD RADIATION MEASUREMENT FCC PART 15 CLASS "B" LIMITS**

REPORT #: G809170  
MANUFACTURE: Ten-Tec Inc.  
MODEL #: RX400  
DATE: 9/15/2008  
NOTE: Temp: 21.7°C Humidity: 52%

DELTA REFERS TO THE dB DIFFERENCE BETWEEN THE HORIZONTAL OR VERTICAL READING AND THE dB LIMIT AT THAT FREQUENCY.

THE FOLLOWING ARE PEAK READINGS WITH CABLE AND ANTENNA FACTORS INCLUDED EXCEPT AS NOTED BY "QP".

"QP" = QUASI PEAK READING AT THAT FREQUENCY

SPECTRUM ANALYZER SETTINGS: 30MHz - 1GHz  
RBW: 100KHz  
VBW: 100KHz

TEST DISTANCE BETWEEN DEVICE UNDER TEST AND RECEIVING ANTENNA: 3-METERS

FREQ. (MHz)	HORZ. dBuV/m	VERT. dBuV/m	H DELTA (dBuV)	V DELTA (dBuV)	LIMIT CLASS "B"	FREQ. STATUS
125	22.4	28.8	-21.1	-14.7	43.5	
150	26.2	27.2	-17.3	-16.3	43.5	
200	31.6	35.7	-11.9	-7.8	43.5	
225	36.2	31.4	-9.8	-14.6	46	
250	37.7	38.8	-8.3	-7.2	46	
275	30.15	27.25	-15.85	-18.75	46	
300	37.6	38.2	-8.4	-7.8	46	
325	31.15	31.85	-14.85	-14.15	46	
350	28.5	27.5	-17.5	-18.5	46	
375	25.45	27.35	-20.55	-18.65	46	
450	36.9	38.1	-9.1	-7.9	46	
500	42.3	41.9	-3.7	-4.1	46	
500	40.5	40.3	-5.5	-5.7	46	
600	41	40.9	-5	-5.1	46	
625	39.1	38.2	-6.9	-7.8	46	
700	36.3	36.9	-9.7	-9.1	46	
775	37.9	38.4	-8.1	-7.6	46	
800	37.6	37.5	-8.4	-8.5	46	

(QP)

**SUPPLEMENTAL DATA****REPORT # G809170**

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TEL:(865)523-9972 FAX:(865)637-7598

**OPEN FIELD RADIATION MEASUREMENT FCC PART 15 CLASS "B" LIMITS**

**REPORT #:** G809170  
**MANUFACTURE:** Ten-Tec Inc.  
**MODEL #** RX400  
**DATE:** 9/15/2008  
**NOTE:** Temp: 21.7°C Humidity: 52%

DELTA REFERS TO THE dB DIFFERENCE BETWEEN THE HORIZONTAL OR VERTICAL READING AND THE dB LIMIT AT THAT FREQUENCY.

THE FOLLOWING ARE AVERAGE READINGS WITH CABLE AND ANTENNA FACTORS INCLUDED.

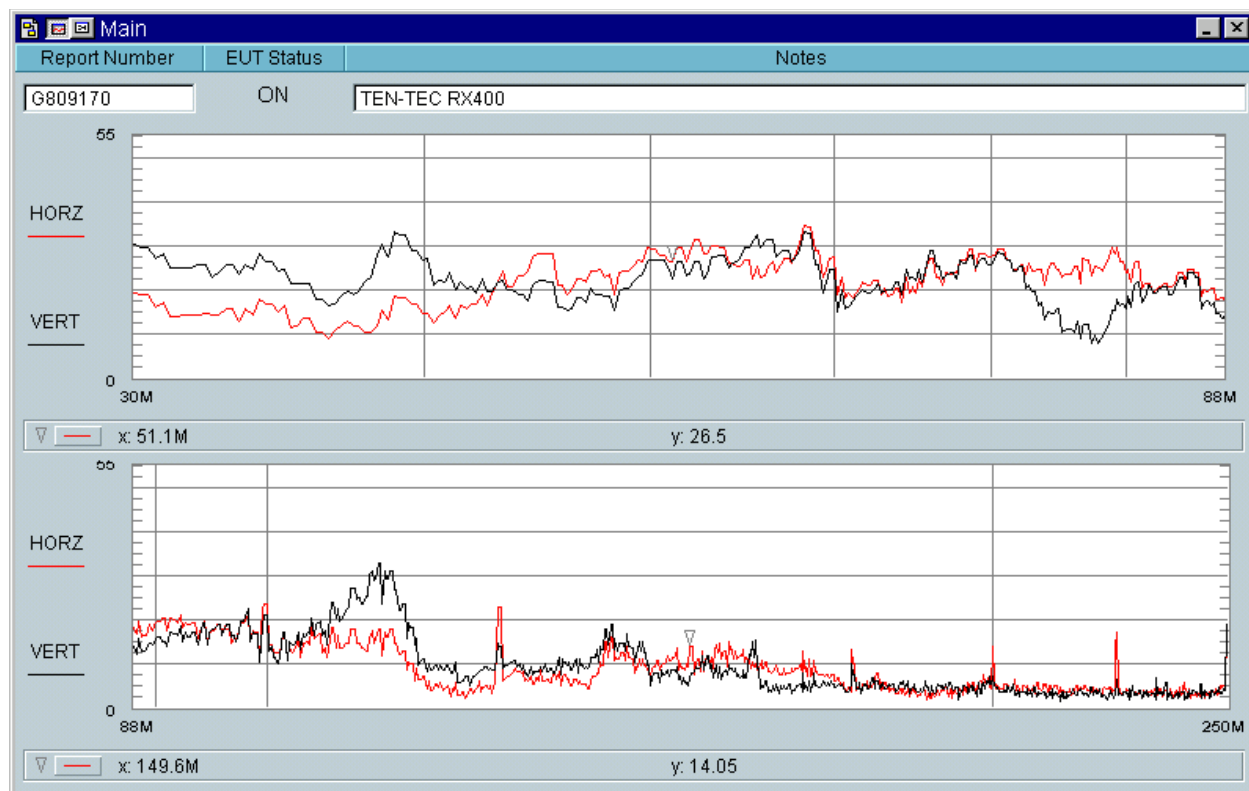
**SPECTRUM ANALYZER SETTINGS:** 1GHz - 15GHz  
RBW: 1MHz  
VBW: 1Hz

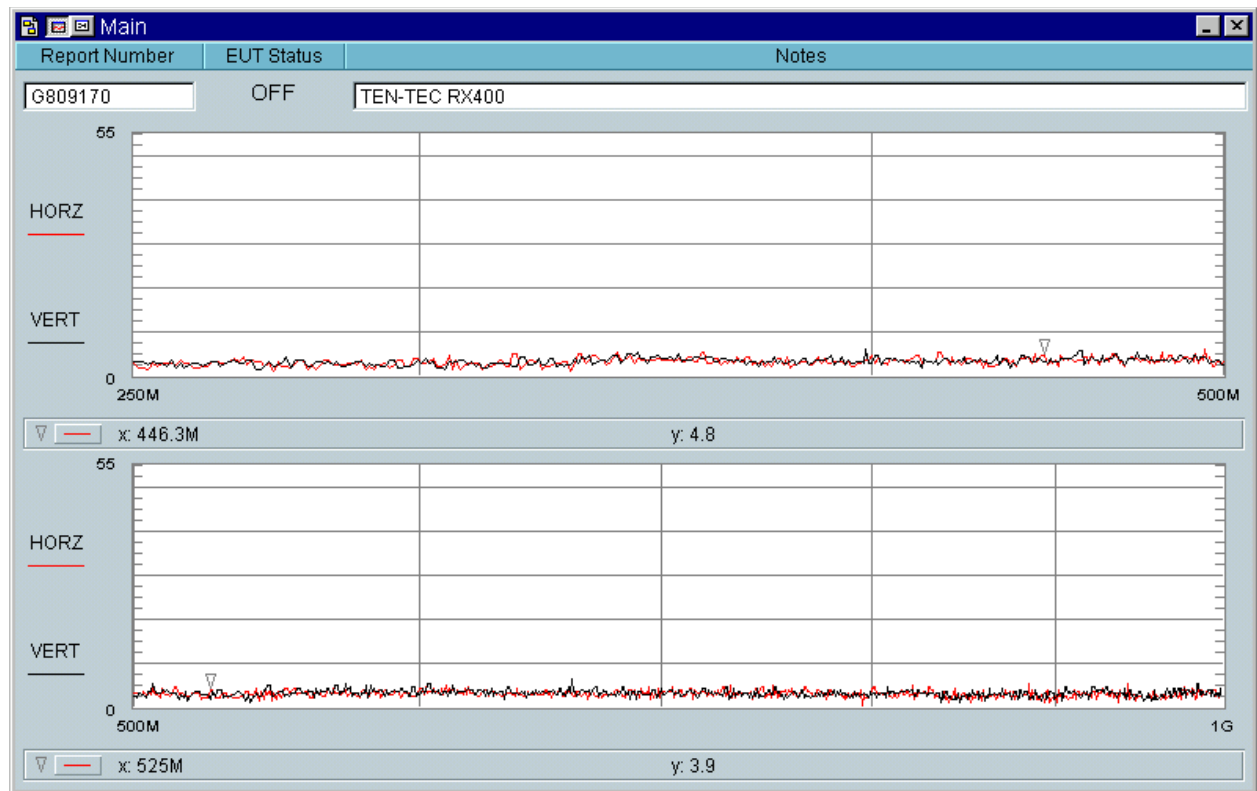
**TEST DISTANCE BETWEEN DEVICE UNDER TEST AND RECEIVING ANTENNA:** 3-METERS

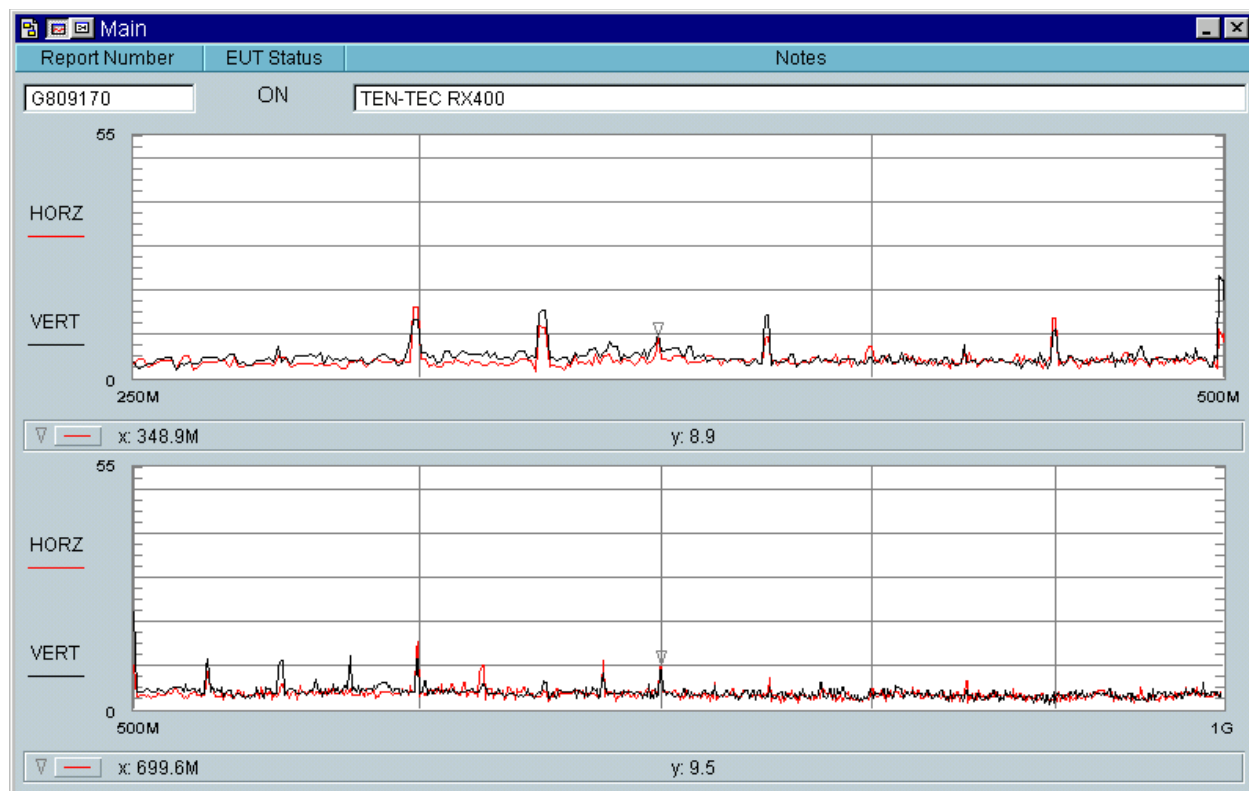
FREQ. (MHz)	HORZ. dBuV/m	VERT. dBuV/m	H DELTA (dBuV)	V DELTA (dBuV)	LIMIT CLASS "B"	FREQ. STATUS
1050	33.91	38.71	-19.99	-15.19	53.9	
1350	36.62	40.02	-17.28	-13.88	53.9	
1500	31.7	40.95	-22.2	-12.95	53.9	
1550	37.6528	38.4528	-16.2472	-15.4472	53.9	
1600	37.3628	33.3128	-16.5372	-20.5872	53.9	
1700	34.8328	33.8328	-19.0672	-20.0672	53.9	
1800	31.3528	35.8028	-22.5472	-18.0972	53.9	

**SECTION 6**  
**PRESCANS**  
**REPORT # G809170**











**SECTION 7  
IMMUNITY TO CELLULAR SIGNAL  
REPORT # G809170**

**FCC Part 15 -FAILING  
Section 15.121**

**MFG:** Ten-Tec

**TESTED BY:** B. Gervais

**MODEL:** RX400

**TEST DATE:** 10-22-2008

**Test Conditions:** Temperature: 70° F

Relative Humidity: 46%

**Frequency Range Tested:** 2MHz – 3GHz

FREQUENCY (MHz)	SIGNAL AMPLITUDE	AFFECTED FREQUENCY RANGE (MHz)	SIGNAL LEVEL
859	-90dBm	1080	63
824	-52dBm	823.9875 – 848.9875, 1080	129, 62
837	-52dBm	1080	62
849	-52dBm	849 – 849.0125, 1080	127, 62
869	-52dBm	868.9875 – 869, 1080	128, 63
882	-52dBm	1080	63
894	-52dBm	869.0125 – 894.0125, 1080	129, 64

\*\* The equipment was tested and found not to comply with the specifications called out in Section 15.121 of the FCC rules and regulations Part 15. \*\*

**FCC Part 15-  
Section 15.121**  
**Passed with New Firmware**

**MFG:** Ten-Tec**TESTED BY:** B. Gervais**MODEL:** RX400**TEST DATE:** 10-28-2008**Test Conditions:** Temperature: 70° F

Relative Humidity: 46%

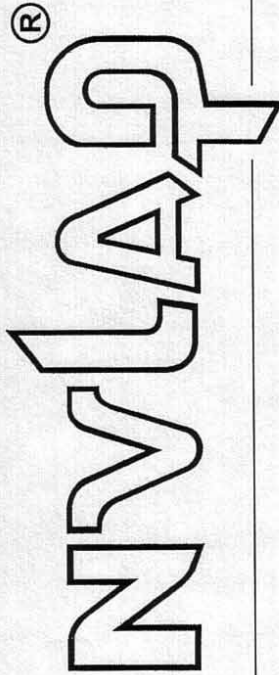
**Frequency Range Tested:** 2MHz – 3GHz

FREQUENCY (MHz)	SIGNAL AMPLITUDE	AFFECTED FREQUENCY RANGE (MHz)	SIGNAL LEVEL
859	-90dBm	None	
824	-52dBm	None	
837	-52dBm	None	
849	-52dBm	None	
869	-52dBm	None	
882	-52dBm	None	
894	-52dBm	None	

\*\* The equipment was tested and found to comply with the specifications called out in Section 15.121 of the FCC rules and regulations Part 15. \*\*

**SECTION 8**  
**NVLAP CERTIFICATE**  
**REPORT # G809170**

United States Department of Commerce  
National Institute of Standards and Technology



## Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200409-0

**Global Testing Laboratories, LLC**  
Knoxville, TN

is accredited by the National Voluntary Laboratory Accreditation Program for specific services,  
listed on the Scope of Accreditation, for:

### **ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS**

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality  
management system (refer to joint ISO-ILAC-IAF Communiqué dated 18 June 2005).*

2008-07-01 through 2009-06-30

Effective dates



*Dolly S. Buice*  
For the National Institute of Standards and Technology