



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

MODEL: 539 (FCC ID: DJ7-539)

ADDITIONAL MODELS: None

REPORT NUMBER: G1211132

Report Date: November 6, 2012

Date Test Sample Received: November 1, 2012

**This report concerns: ANSI C63.4 (2009) with
FCC Method 47 CFR Part 15, Subpart B**

Test report was prepared by and test performed at:

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

Tested By	<i>Benjamin P. Gervais</i> Ben Gervais EMC technician	<u>November 5, 2012</u> Date
Written By	<i>Cailé Gonzalez</i> Cailé Gonzalez Vice President of Operations	<u>November 6, 2012</u> Date
Approved By	<i>Deborah Walker</i> Deborah Walker CEO/President	<u>November 7, 2012</u> Date

LIST OF EXHIBITS REPORT # G1211132

1. Summary of Results
2. Engineering Statement
3. System Test Configuration
4. Conducted Emissions (FCC Part 15)
5. Radiated Emissions (FCC Part 15)
6. Copy NVLAP Certificate

**SECTION 1
SUMMARY OF RESULTS
REPORT # G1211132**

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: 539, which indicates that the previously mentioned equipment **MEETS** the requirements as set forth by the following standards:

Conducted Emissions (FCC Part 15)
Radiated Emissions (FCC Part 15)

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.



**Cailé Gonzalez
Global Testing Laboratories, LLC**

**SECTION 2
ENGINEERING STATEMENT
REPORT # G1211132**



Engineering Statement

All measurement data on the attached reports was taken pursuant to ANSI C63.4 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.

The testing on the Ten Tec Model: 539 was performed on November 5, 2012. The data contained within this technical report was compiled and approved by:

A handwritten signature in black ink that reads "Cailé Gonzalez".

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

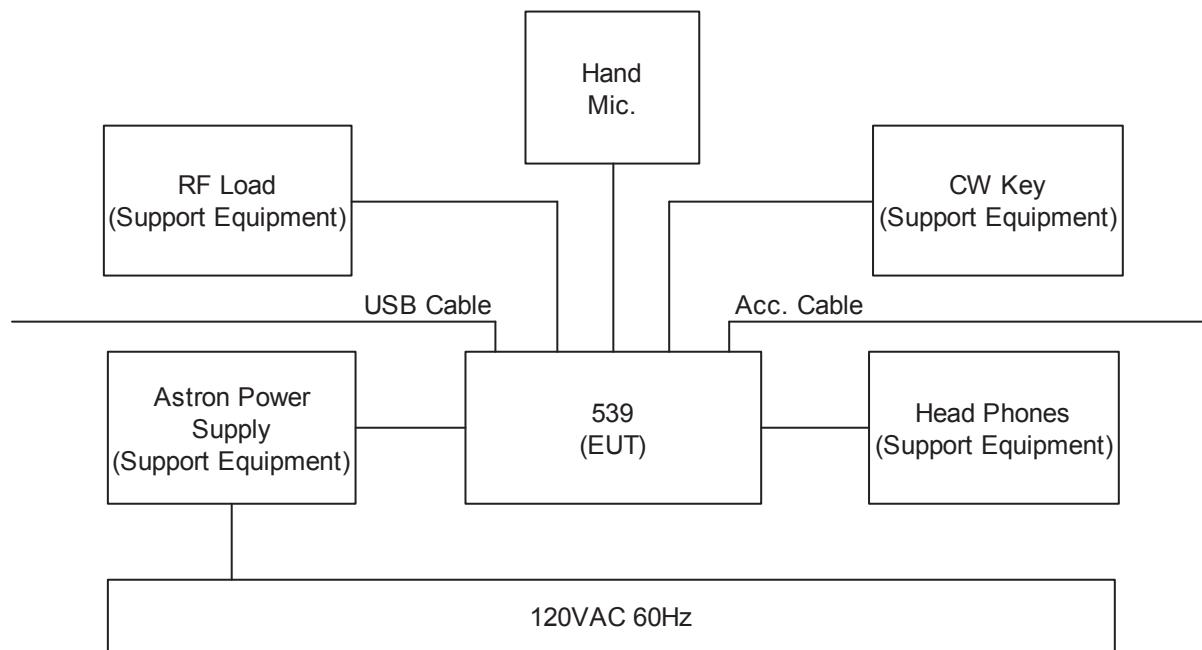
SECTION 3

SYSTEM TEST CONFIGURATION

REPORT # G1211132



The **Ten Tec Model: 539** was configured into a simulated installation.



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

**SECTION 4
CONDUCTED EMISSIONS
REPORT # G1211132**

TEST PROCEDURE: ANSI C63.4 (2009) with FCC Method 47 CFR Part 15, Subpart B

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 CISPR 22/EN 55022. 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 R&S ESCI Spectrum Analyzer. The EUT was observed from 150 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:

**02/22/12 02/22/13 R&S ESCI s/n: 100389 Spectrum Analyzer (1009)
11/30/11 11/30/12 Fisher 50Ω /50µH s/n: 9705 LISN (2001)
11/30/11 11/30/12 Fisher 50Ω /50µH s/n: 9706 LISN (2002)
Software Rohde & Schwarz EMC32 Ver. 8.52.0**

SUPPLEMENTAL DATA**REPORT # G1211132****Test Report****Common Information**

Report Number: G1211132
Date: 11/05/12
Environment Conditions: 75°F 32%H
Operator Name: B. Gervais
Comment:

EUT Information

Manufacturer: Ten-Tec
Model: 539
Comments:

EMI Auto Test Template: FCC Part 15 Class B

Hardware Setup: Conducted Emissions 150kHz - 30MHz
Measurement Type: 2 Line LISN
Frequency Range: 150 kHz - 30 MHz
Graphics Level Range: 0 dB μ V - 80 dB μ V

Preview Measurements:
Scan Test Template: FCC Part 15 Class B

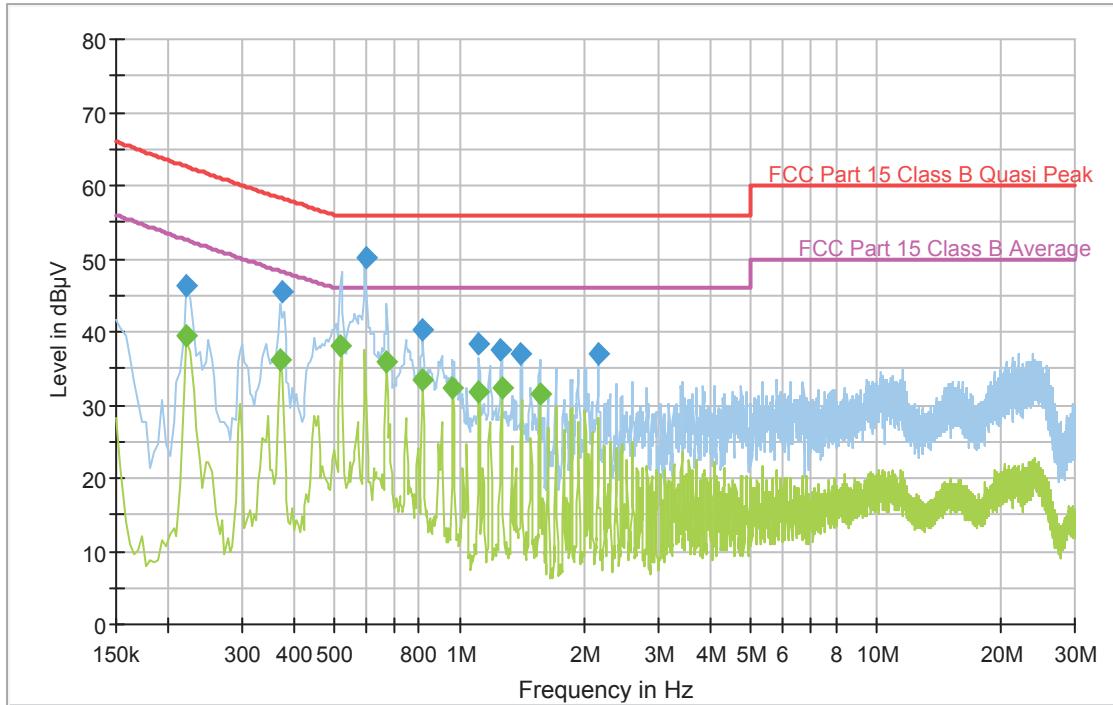
Data Reduction:
Limit Line #1: FCC Part 15 Class B Quasi Peak
Limit Line #2: FCC Part 15 Class B Average
Peak Search: 6 dB , Maximum Results: 10
Subrange Maxima: 10 Subranges , Maxima per Subrange: 1
Maximum Number of Results: 10
After Data Reduction: Interactive data reduction

Frequency Zoom:
Zoom Scan Template: FCC Part 15 Class B

Final Measurements:
Template for Single Meas.: FCC Part 15 Class B Final

Report Settings:
Report Template: Conducted Emissions
Create Electronic Report: RTF
Document Name: EMI Report

FCC Part 15 Class B



Final Result 1

Frequency (MHz)	MaxPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.222000	46.4	2000.0	9.000	GND	L1	9.9	16.1	62.6	
0.376000	45.5	2000.0	9.000	GND	L1	10.0	12.7	58.2	
0.596000	50.1	2000.0	9.000	GND	L1	10.0	5.9	56.0	
0.816000	40.3	2000.0	9.000	GND	L1	10.0	15.7	56.0	
1.116000	38.3	2000.0	9.000	GND	L1	10.0	17.7	56.0	
1.260000	37.6	2000.0	9.000	GND	L1	10.0	18.4	56.0	
1.408000	37.0	2000.0	9.000	GND	L1	10.0	19.0	56.0	
2.156000	37.1	2000.0	9.000	GND	L1	10.0	18.9	56.0	

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.222000	39.4	2000.0	9.000	GND	L1	9.9	13.2	52.5	
0.372000	36.2	2000.0	9.000	GND	L1	10.0	12.1	48.3	
0.520000	38.2	2000.0	9.000	GND	L1	10.0	7.8	46.0	
0.668000	36.0	2000.0	9.000	GND	L1	10.0	10.0	46.0	
0.816000	33.3	2000.0	9.000	GND	L1	10.0	12.7	46.0	
0.964000	32.3	2000.0	9.000	GND	L1	10.0	13.7	46.0	
1.116000	31.9	2000.0	9.000	GND	L1	10.0	14.1	46.0	
1.264000	32.3	2000.0	9.000	GND	L1	10.0	13.7	46.0	
1.560000	31.4	2000.0	9.000	GND	L1	10.0	14.6	46.0	

SUPPLEMENTAL DATA**REPORT # G1211132****Test Report****Common Information**

Report Number: G1211132
Date: 11/05/12
Environment Conditions: 75°F 32%H
Operator Name: B. Gervais
Comment:

EUT Information

Manufacturer: Ten-Tec
Model: 539
Comments:

EMI Auto Test Template: FCC Part 15 Class B

Hardware Setup: Conducted Emissions 150kHz - 30MHz
Measurement Type: 2 Line LISN
Frequency Range: 150 kHz - 30 MHz
Graphics Level Range: 0 dB μ V - 80 dB μ V

Preview Measurements:
Scan Test Template: FCC Part 15 Class B

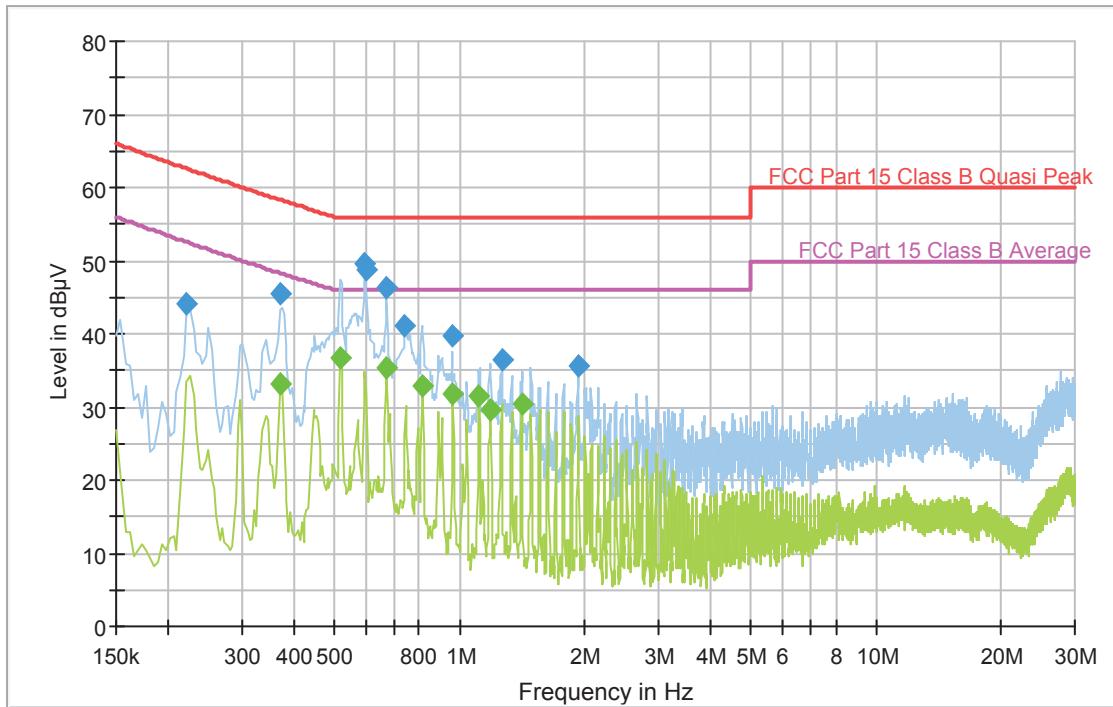
Data Reduction:
Limit Line #1: FCC Part 15 Class B Quasi Peak
Limit Line #2: FCC Part 15 Class B Average
Peak Search: 6 dB , Maximum Results: 10
Subrange Maxima: 10 Subranges , Maxima per Subrange: 1
Maximum Number of Results: 10

Frequency Zoom:
Zoom Scan Template: FCC Part 15 Class B

Final Measurements:
Template for Single Meas.: FCC Part 15 Class B Final

Report Settings:
Report Template: Conducted Emissions
Create Electronic Report: RTF
Document Name: EMI Report

FCC Part 15 Class B



Final Result 1

Frequency (MHz)	MaxPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.222000	44.0	2000.0	9.000	GND	N	9.9	18.6	62.6	
0.372000	45.5	2000.0	9.000	GND	N	10.0	12.9	58.3	
0.592000	49.6	2000.0	9.000	GND	N	10.0	6.4	56.0	
0.596000	48.9	2000.0	9.000	GND	N	10.0	7.1	56.0	
0.668000	46.3	2000.0	9.000	GND	N	10.0	9.7	56.0	
0.740000	41.0	2000.0	9.000	GND	N	10.0	15.0	56.0	
0.964000	39.8	2000.0	9.000	GND	N	10.0	16.2	56.0	
1.264000	36.5	2000.0	9.000	GND	N	10.0	19.5	56.0	
1.932000	35.7	2000.0	9.000	GND	N	10.0	20.3	56.0	

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.372000	33.2	2000.0	9.000	GND	N	10.0	15.1	48.3	
0.520000	36.8	2000.0	9.000	GND	N	10.0	9.2	46.0	
0.668000	35.2	2000.0	9.000	GND	N	10.0	10.8	46.0	
0.816000	32.8	2000.0	9.000	GND	N	10.0	13.2	46.0	
0.964000	31.7	2000.0	9.000	GND	N	10.0	14.3	46.0	
1.112000	31.4	2000.0	9.000	GND	N	10.0	14.6	46.0	
1.188000	29.6	2000.0	9.000	GND	N	10.0	16.4	46.0	
1.412000	30.5	2000.0	9.000	GND	N	10.0	15.5	46.0	

SECTION 5
RADIATED EMISSIONS
REPORT # G1211132

**TEST PROCEDURE: ANSI C63.4 (2009) with
FCC Method 47 CFR Part 15, Subpart B**

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 50Ω input of the 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 1 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 $\text{dB}\mu\text{v}(\text{QP})$. The Radiated Field Strength was calculated as follows: Maximum Emission Received (dB) + Antenna Factor (dB) + Cable Loss (dB) = Field Strength $\text{dB}\mu\text{v}/\text{Meter}$.

Equipment Used During Testing:

Cal. Date: Cal. Due:

2/22/12	2/22/13	R&S ESCI	s/n: 100389	Spectrum Analyzer (1009)
2/21/12	2/21/13	EMCO 3110B	s/n: 93041679	Biconical Antenna (2074)
2/21/12	2/21/13	EMCO 3146	s/n: 93033571	Log-Periodic Antenna (2077)

Software EMC Emissions Ver. 1.0 (GTL Developed Software)

SUPPLEMENTAL DATA**REPORT # G1211132**

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 #: G1211132
MANUFACTURE: Ten-Tec
MODEL #: 539
DATE: 11/5/2012
NOTE:

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 LEVEL	FREQ. STATUS
110.6	28.36	38.66	-15.14	-4.84	43.5	
122.89	37.64	39.64	-5.86	-3.86	43.5	
135.18	33.5	39.1	-10	-4.4	43.5	
147.47	32.6	37.2	-10.9	-6.3	43.5	
221.19	42.54	36.54	-3.46	-9.46	46	

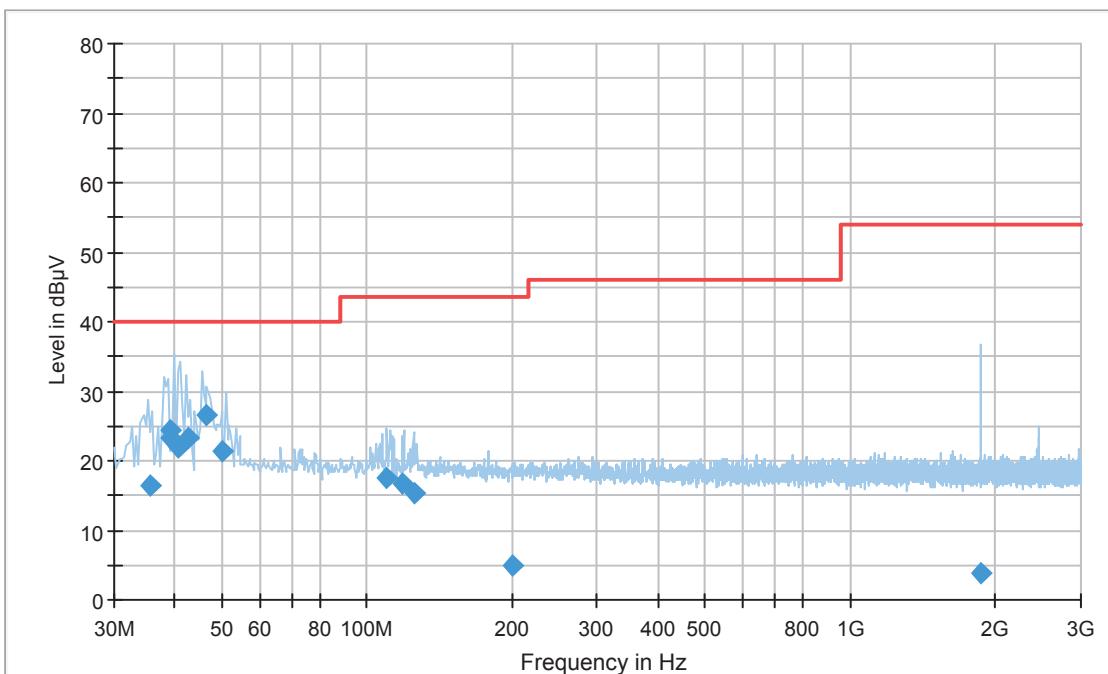
SUPPLEMENTAL DATA - Prescans**REPORT # G1211132****Common Information**

Report Number: G1211132
Date: 11/05/12
Environment Conditions: 75°F 32%H
Operator Name: B. Gervais
Comment:

EUT Information

Manufacturer: Ten-Tec
Model: 539
Comments:

Prescan FCC Part 15 Class B

**Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV)
35.557500	16.5	2000.0	120.000	150.0	V	-1.0	0.1	23.5	40.0
39.247500	24.5	2000.0	120.000	150.0	V	-1.0	0.1	15.5	40.0
39.263750	23.4	2000.0	120.000	150.0	V	179.0	0.1	16.6	40.0
40.777500	21.8	2000.0	120.000	150.0	V	90.0	0.1	18.2	40.0
42.571250	23.3	2000.0	120.000	150.0	V	-1.0	0.1	16.7	40.0
46.312500	26.5	2000.0	120.000	150.0	V	-1.0	0.1	13.5	40.0
50.361250	21.2	2000.0	120.000	150.0	V	276.0	0.1	18.8	40.0
109.230000	17.6	2000.0	120.000	150.0	V	82.0	0.1	25.9	43.5
118.580000	16.7	2000.0	120.000	150.0	V	89.0	0.1	26.8	43.5
125.040000	15.4	2000.0	120.000	150.0	V	179.0	0.1	28.1	43.5
200.397500	5.0	2000.0	120.000	150.0	H	276.0	0.1	38.6	43.5
1867.538750	3.8	2000.0	120.000	150.0	V	276.0	0.1	50.2	54.0

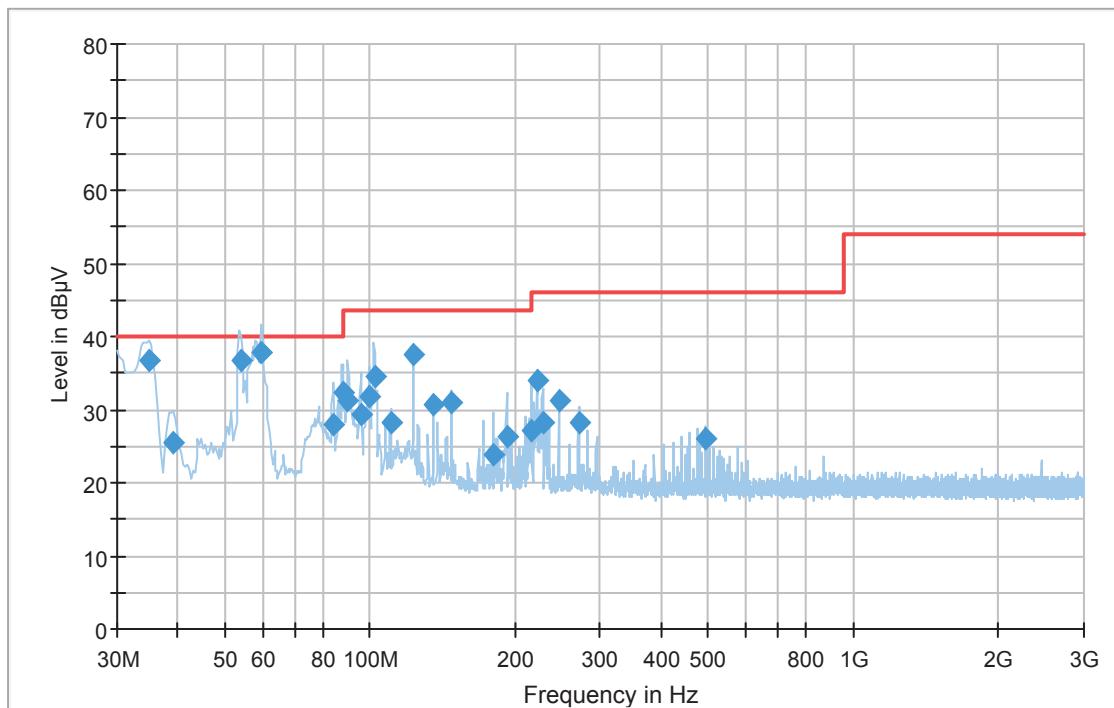
Common Information

Report Number: G1211132
Date: 11/05/12
Environment Conditions: 75°F 32%H
Operator Name: B. Gervais
Comment:

EUT Information

Manufacturer: Ten-Tec
Model: 539
Comments:

Prescan FCC Part 15 Class B



Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V)
35.026250	36.6	2000.0	120.000	150.0	V	88.0	0.1	3.4	40.0
39.081250	25.4	2000.0	120.000	150.0	V	46.0	0.1	14.6	40.0
54.120000	36.6	2000.0	120.000	150.0	V	100.0	0.1	3.4	40.0
59.820000	37.9	2000.0	120.000	150.0	H	185.0	0.1	2.1	40.0
83.962500	27.9	2000.0	120.000	150.0	H	185.0	0.1	12.1	40.0
87.863750	32.3	2000.0	120.000	150.0	H	185.0	0.1	7.7	40.0
89.851250	31.2	2000.0	120.000	150.0	H	201.0	0.1	12.3	43.5
95.962500	29.4	2000.0	120.000	150.0	H	185.0	0.1	14.2	43.5
99.875000	31.8	2000.0	120.000	150.0	H	351.0	0.1	11.7	43.5
102.182500	34.6	2000.0	120.000	150.0	H	321.0	0.1	8.9	43.5
110.601250	28.3	2000.0	120.000	150.0	V	255.0	0.1	15.3	43.5
122.892500	37.5	2000.0	120.000	150.0	V	144.0	0.1	6.0	43.5
135.183750	30.7	2000.0	120.000	150.0	V	316.0	0.1	12.8	43.5
147.475000	30.8	2000.0	120.000	150.0	V	196.0	0.1	12.7	43.5
180.065000	23.8	2000.0	120.000	150.0	H	95.0	0.1	19.7	43.5
191.945000	26.3	2000.0	120.000	150.0	H	111.0	0.1	17.3	43.5
215.865000	27.1	2000.0	120.000	150.0	H	274.0	0.1	16.5	43.5
221.193750	34.0	2000.0	120.000	150.0	H	274.0	0.1	12.1	46.0
227.876250	28.2	2000.0	120.000	150.0	H	81.0	0.1	17.9	46.0
245.776250	31.2	2000.0	120.000	150.0	H	111.0	0.1	14.8	46.0
270.358750	28.2	2000.0	120.000	150.0	H	51.0	0.1	17.8	46.0
496.330000	26.0	2000.0	120.000	150.0	V	46.0	0.1	20.0	46.0

SECTION 6
NVLAP CERTIFICATE
REPORT # G1211132

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 January 2009).*

2012-07-01 through 2013-06-30

Effective dates



A handwritten signature in black ink, appearing to read "W. R. M. L." or a similar variation.

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2009-01-28)