APPLICATION

For

GRANT OF CERTIFICATION

FOR

MODEL:

STREETPILOT 7XXX
FM Transmitter
P/N 010-00400-xx

FOR

GARMIN INTERNATIONAL, INC.

1200 East 151st Street
Olathe, KS 66062

ROGERS LABS, INC.

4405 West 259th Terrace
Louisburg, KS 66053
Phone / Fax (913) 837-3214

TEST REPORT

For

APPLICATION of CERTIFICATION

For

GARMIN INTERNATIONAL, INC.

1200 East 151st Street
Olathe, KS 66062
Phone: (913) 397-8200

Mr. Van Ruggles
Director of Quality Assurance

MODEL: STREETPILOT 7XXX PN 010-00400-xx

FM Transmitter
FREQUENCY: 88-108 MHz

FCC ID: IPH-08900

Test Date: August 10, 2005

Certifying Engineer: Scot D Rogers

Scot D. Rogers
ROGERS LABS, INC.
4405 West 259th Terrace
Louisburg, KS 66053
Phone: (913) 837-3214
FAX: (913) 837-3214

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Applicable Standards & Test Procedures

a) In accordance with the Federal Communications Code of Federal Regulations, dated October 1, 2004, Part 2, Subpart J, Paragraphs 2.907, 2.911, 2.913, 2.925, 2.926, 2.1031 through 2.1057, applicable parts of paragraph 15, Part 15C paragraphs 15.231 the following information is submitted.

b) Test procedures used are the established Methods of Measurement of Radio-Noise Emissions as described in the ANSI 63.4-2003 Document FCC and documents DA00-1407 and DA00-705.

Equipment Tested

Equipment	Serial Number	FCC I.D.#
StreetPilot 7200	#15	IPH
GPS receiver	ENG #1	DoC
XM receiver	416	DoC
GTM10 receiver	49900015	DoC
Automotive Mount	#4	N/A
Headphones		

List of Test Equipment

A Hewlett Packard 8591EM and or 8562A Spectrum Analyzer was used as the measuring device for the emissions testing. The analyzer settings used are described in the following table. Refer to the Appendix for a complete list of Test Equipment.

HP 8591EM SPECTRUM ANALYZER SETTINGS		
CONDUCTED EMISSIONS:		
RBW	AVG. BW	DETECTOR FUNCTION
9 kHz	30 kHz	Peak/Quasi Peak
RADIATED EMISSIONS (30 – 1000 MHz):		
RBW	AVG. BW	DETECTOR FUNCTION
120 kHz	300 kHz	Peak/Quasi Peak
HP 8562A SPECTRUM ANALYZER SETTINGS		
RADIATED EMISSIONS (1 – 40 GHz):		
RBW	AVG. BW	DETECTOR FUNCTION
1 MHz	1 MHz	Peak/Average
ANTENNA CONDUCTED EMISSIONS:		
RBW	AVG. BW	DETECTOR FUNCTION
120 kHz	300 kHz	Peak

2.1033(b) Application for Certification

(1) Manufacturer: GARMIN INTERNATIONAL, INC.
1200 East 151st Street
Olathe, KS 66062
PHONE: (913) 397-8200

(2) FCC Identification: FCC I.D.: IPH-08900

(3) Copy of the installation and operating manual:
Refer to exhibit for Draft Instruction Manual.

(4) Description of Circuit Functions, Device Operation:
The StreetPilot 7xxx is a low power FM transmitter.

(5) Block Diagram with Frequencies:
Refer to exhibit for the Block Diagram

(6) Report of measurements showing compliance with the pertinent FCC technical requires are provided in this report.

(7) Photographs of equipment are provided in this report and exhibits.

(8) Peripheral equipment or accessories for the equipment include output jack for audio, input port for XM receiver, GTM10 receiver, GPS receiver, Automotive mount with cabling, and video input. The unit was tested with all of the available peripheral options and continues to demonstrate compliance with the regulations.

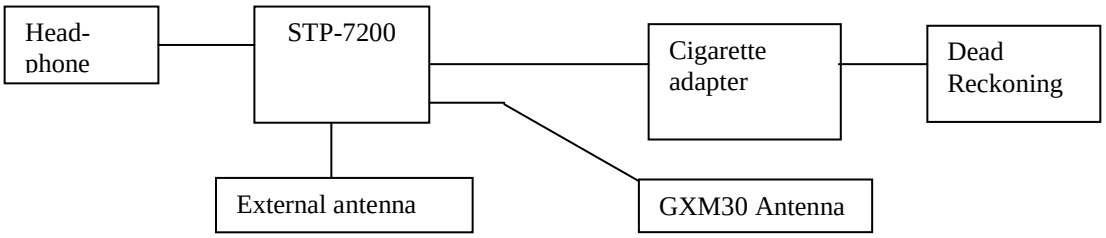
(9) Transition Provisions of 15.37 are not being requested.

(10) The equipment is not a scanning receiver.

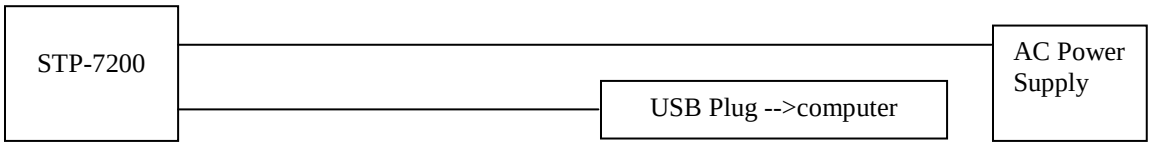
(11) The equipment is not a transmitter-operating in the 59-64 GHz frequency range.

Configuration options for the EUT

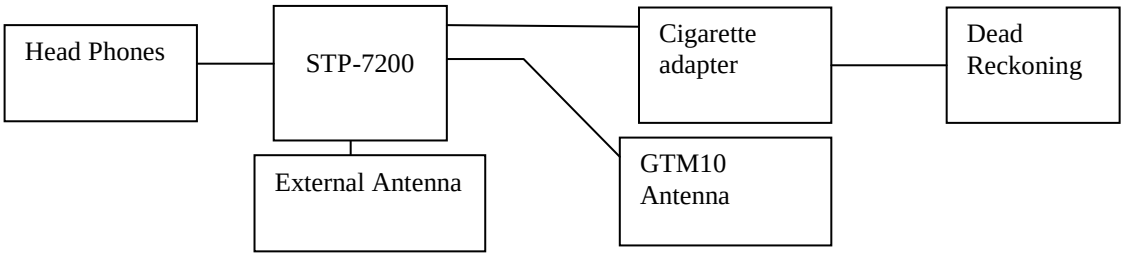
1. STP-7200 (GPN: 010-00400-10) connected to car cigarette lighter, power cable assembly (GPN: 011-01135-50), GA 27C external antenna (GPN: 011-00149-05), GXM30 XM Antenna(011-01160-00), Dead Reckoning Cable(320-00171-20)
And a set of headphones, while broadcasting FM.



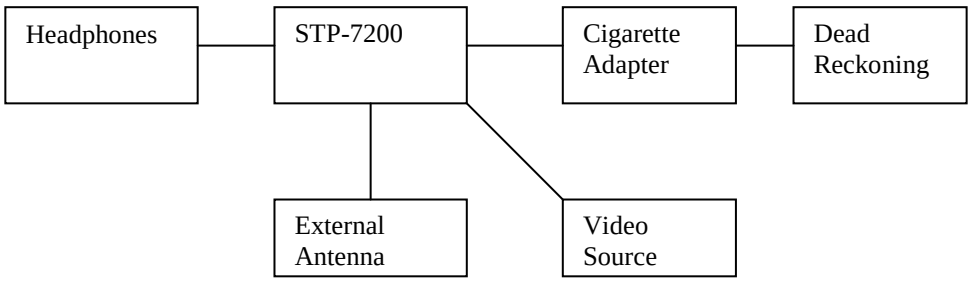
2. STP-7200 connected to AC power supply(320-00261-00/01), and to computer through USB cable (GPN: 325-00128-00).



3. STP-7200 Connected to car cigarette lighter assembly, Dead Reckoning cable, GA 27C external antenna, GTM10 FM Traffic reciever(010-00396-00), and headphones, While broadcasting FM.



4. STP-7200 connected to cigarette lighter assembly, GA27C external antenna, Dead reckoning cable, headphones and a video source.



Equipment and Cable Configuration

Test Setup

The EUT was arranged in typical user equipment configurations (configurations 1, 3, and 4 were investigated for this report). The StreetPilot 7xxx is a display and control unit for the GPS receiver used for location and navigation. It may be connected to periphery equipment as shown in the configurations diagram offering a variety of functionality for the end user. The FM transmitter would be used to interface with the FM receiver in an automobile to allow utilization of the cars audio system. For testing purposes, the unit was powered from the manufacturer supplied automotive wiring harness connected to a DC power supply. As requested by the manufacturer and required by the CFR, the unit was tested for emissions compliance using the available configurations with the worst-case data presented. Test results in this report relate only to the products described in this report.

Equipment Function and Testing Procedures

The EUT is a multi-channel transmitter operating in the FM radio band. The unit allows a message, recorded or live, to be broadcast to a FM receiver in close proximity. The unit is targeted to broadcast the message received to the local automobile audio system. The design of the system allows for the use of FM channels not currently in use in the vehicles area.

AC Line Conducted Emission Test Procedure

The equipment operates solely from DC power offered in an auxiliary power port inside an automobile and is therefore exempt from AC Line conducted emissions testing.

Radiated Emission Test Procedure

The EUT was placed on a rotating 1 x 1.5-meter wooden platform 0.8 meters above the ground plane at a distance of 3 meters from the FSM antenna. EMI energy was maximized by equipment placement, raising and lowering the FSM antenna, changing the antenna polarization, and by rotating the turntable. Each emission was maximized before data was taken using a spectrum analyzer. Refer to photographs in exhibits for EUT placement.

Units of Measurements

Conducted EMI: Data is in dBµV; dB referenced to one microvolt.

Radiated EMI: Data is in dBµV/m; dB/m referenced to one microvolt per meter.

Test Site Locations

Radiated EMI: The radiated emissions tests were performed at Rogers Labs, Inc. 3 meters Open Area Test Site (OATS).

Site Approval: Refer to Appendix for FCC Site Approval Letter, Reference 90910, Dated August 15, 2003.

Subpart C - Intentional Radiators

As per CFR Part 15, Subpart C the following information is submitted for consideration in obtaining a grant of certification for unlicensed intentional radiators.

15.203 Antenna Requirements

The unit is produced with a permanently attached antenna inside the automotive mount cable harness. No provisions for modification or alterations of the antenna configuration are available to the end user. The requirements of 15.203 are met there are no deviations or exceptions to the specification.

Restricted Bands of Operation Per 15.205

Spurious emissions falling in the restricted frequency bands of operation were measured at the OATS. The EUT utilizes frequency, determining circuitry, which generates harmonics falling in the restricted bands. Emissions were checked at the OATS, using appropriate antennas or pyramidal horns, amplification stages, and a spectrum analyzer. No other significant emission was observed which fell into the restricted bands of operation. Computed emission values take into account the measured radiated field strength, receive antenna correction factor, amplifier gain stage, and test system cable losses.

Sample Calculations:

Computed Peak (dBµV/m @ 3m) = FSM (dBµV) + A.F. (dB) - Gain (dB)
= 50.5 + 6.9 - 30
= 27.4

Data 15.205

Radiated (Highest Emissions):

Emission Frequency (MHz)	FSM Horz. (dBµV)	FSM Vert. (dBµV)	Ant. Factor (dB)	Amp. Gain (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	Limit @ 3m (dBµV/m)
71.4	50.5	41.6	6.9	30	27.4	18.5	40.0
163.2	47.1	39.5	8.8	30	25.9	18.3	43.5
265.2	44.7	34.5	12.6	30	27.3	17.1	46.0

No other emissions found in the restricted bands.

Summary of Results for Radiated Emissions in Restricted Bands

The radiated emissions for the EUT meet the requirements for FCC CFR 47 Part 15.205 restricted bands of operation. The EUT had a 17.6 dB minimum margin below the limits. Other emissions were present with amplitudes at least 20 dB below the FCC Limits.

15.209 Radiated emissions limits; general requirements

Radiated EMI

The EUT was arranged in a typical equipment configuration and operated through all of its various modes. Preliminary testing was performed in a screen room with the EUT positioned 1 meter from the FSM. Radiated emissions measurements were performed to identify the frequencies, which produced the highest emissions. Plots were made of the frequency spectrum from 30 MHz to 1200 MHz for the preliminary testing. The highest radiated emission was then re-maximized at this location before final radiated emissions measurements were performed. Final data was taken with the EUT located at the open field test site at a distance of 3 meters between the EUT and the receiving antenna. The frequency spectrum

from 30 MHz to 20,000 MHz was searched for radiated emissions. Measured emission levels were maximized by EUT placement on the table, changing cable location, rotating the turntable through 360 degrees, varying the antenna height between 1 and 4 meters above the ground plane and changing antenna polarization between horizontal and vertical. Antennas used were Broadband Biconical from 30 MHz to 200 MHz, Log Periodic from 200 MHz to 5 GHz, and/or Biconilog from 30 MHz to 1000 MHz, and Pyramidal Horns.

Data 15.209

Radiated (6 Highest Emissions) 15.209

Emission Freq. (MHz)	FSM Horz. (dBµV)	FSM Vert. (dBµV)	Ant. Factor (dB)	Amp. Gain (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	Limit @ 3m (dBµV/m)
45.2	42.6	47.5	8.5	30	21.1	26.0	40.0
51.0	46.2	39.6	6.7	30	22.9	16.3	40.0
153.0	49.0	42.3	9.1	30	28.1	21.4	43.5
163.2	47.1	39.5	8.8	30	25.9	18.3	43.5
173.4	53.2	44.7	8.9	30	32.1	23.6	43.5
265.2	44.7	34.5	12.6	30	27.3	17.1	46.0

Other emissions were present with amplitudes at least 20 dB below limits.

Sample Calculations:

RFS = Radiated Field Strength
dBµV/m @ 3m = dBµV + A.F. - Amplifier Gain
dBµV/m @ 3m = 42.6 + 8.5 - 30
= 21.1

Summary of Results for General Radiated Emissions

The radiated emissions for the EUT meet the requirements for FCC Part 15C Intentional Radiators. The EUT had an 11.4 dB minimum margin below the limits. Other emissions were present with amplitudes at least 20 dB below the FCC Limits.

15.239 Operation in the Band 88-108 MHz

(a) Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz. The EUT only tunes 88.1-107.9 MHz and the emissions meet the 200 kHz wide band restriction. Therefore, the requirements are met. There are no deviations or exceptions to the specification.

(b) The field strength of any emission within the permitted 200 kHz band shall not exceed 250 micro volts/meter at 3 meters (48 dBµV/m). The emission limit in this paragraph is based on measuring equipment employing an average detector. Emissions were measured and data recorded for this report. No emission was measured above the limitations of this part. Therefore, the requirements are satisfied. There are no deviations or exceptions to the specifications.

(c) The field strength of any emissions radiated on any frequency outside of the 200 kHz band shall not exceed the general radiated emission limits in 15.209. Emissions were measured and data recorded for this report. No emission was measured above the limitations of this part. Therefore, the requirements are satisfied. The requirements of 15.209 are met there are no deviations or exceptions to the specification.

Data 15.239

Intentional and Spurious Emissions:

Emission Frequency (MHz)	FSM Horz. (dBµV)	FSM Vert. (dBµV)	Ant. Factor (dB)	Amp. Gain (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	Limit @ 3m (dBµV/m)
92.5	69.9	69.4	7.7	30	47.6	47.1	48.0
185.0	41.3	28.7	9.6	30	20.9	8.3	43.5
277.5	31.7	26.0	12.7	30	14.4	8.7	46.0
370.0	27.8	22.5	15.5	30	13.3	8.0	46.0
462.5	26.8	22.1	17.6	30	14.4	9.7	46.0
555.0	25.8	22.2	19.2	30	15.0	11.4	46.0
647.5	25.8	22.4	20.5	30	16.3	12.9	46.0
740.0	25.7	22.2	21.9	30	17.6	14.1	46.0
832.5	25.2	21.7	22.4	30	17.6	14.1	46.0
97.1	70.5	69.8	7.4	30	47.9	47.2	48.0
194.2	40.8	34.2	10.8	30	21.6	15.0	43.5
291.3	34.2	24.2	13.8	30	18.0	8.0	46.0
388.4	22.9	23.1	15.9	30	8.8	9.0	46.0
485.5	22.9	22.6	17.6	30	10.5	10.2	46.0
582.6	21.9	22.0	19.6	30	11.5	11.6	46.0
873.9	21.9	35.6	23.3	30	15.2	28.9	46.0
107.9	70.2	68.4	6.9	30	47.1	45.3	48.0
215.8	37.0	27.1	10.9	30	17.9	8.0	43.5
323.7	30.1	23.9	14.6	30	14.7	8.5	46.0
431.6	22.5	22.7	16.7	30	9.2	9.4	46.0
539.5	22.1	22.2	19.4	30	11.5	11.6	46.0
647.4	22.5	22.3	20.5	30	13.0	12.8	46.0
755.3	22.5	22.6	22.2	30	14.7	14.8	46.0
863.2	23.7	29.8	23.0	30	16.7	22.8	46.0

Other emissions were present with amplitudes at least 20 dB below limits.

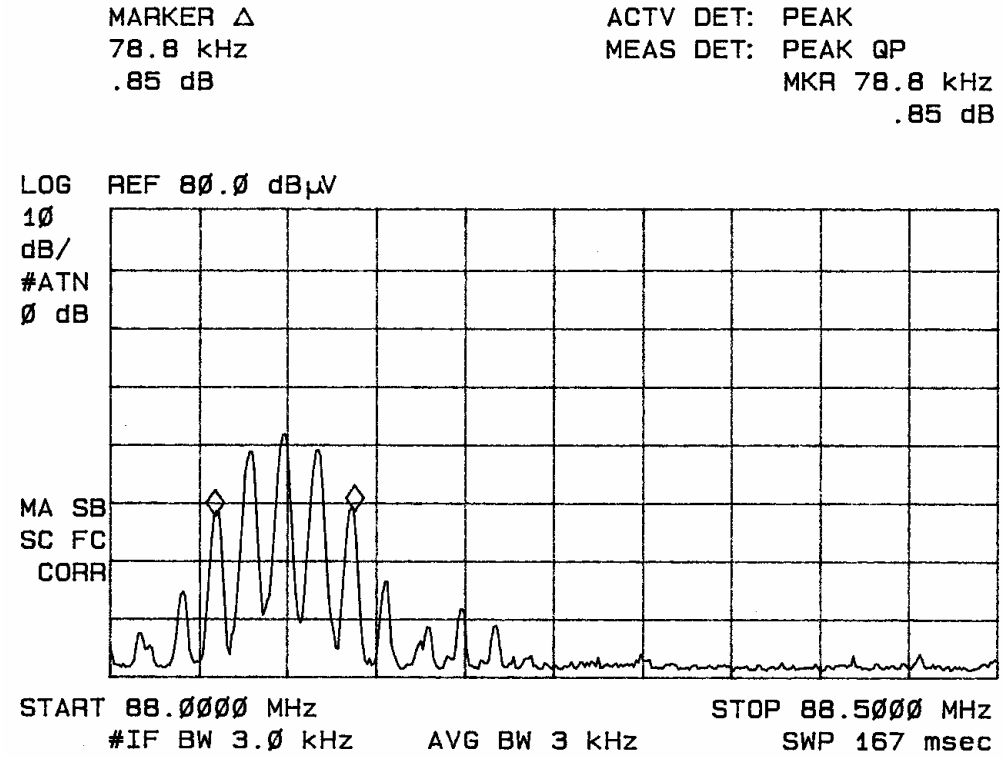


Figure one Band Edges of operation (at 88.1 MHz)

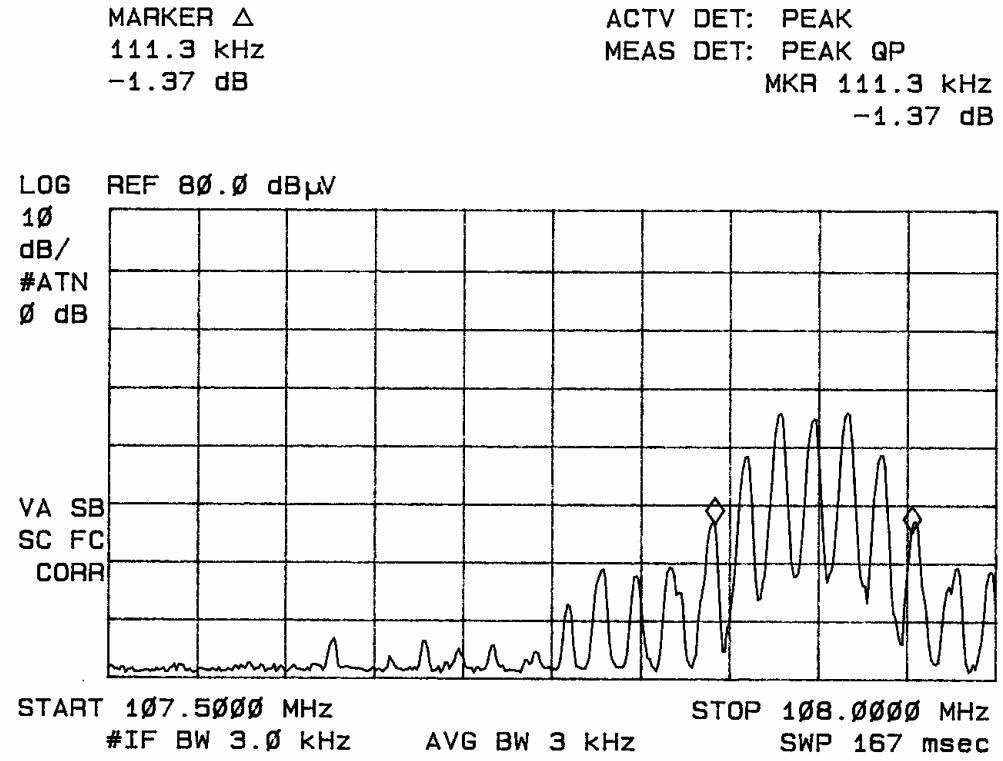


Figure two Band Edges of operation (at 107.9 MHz)

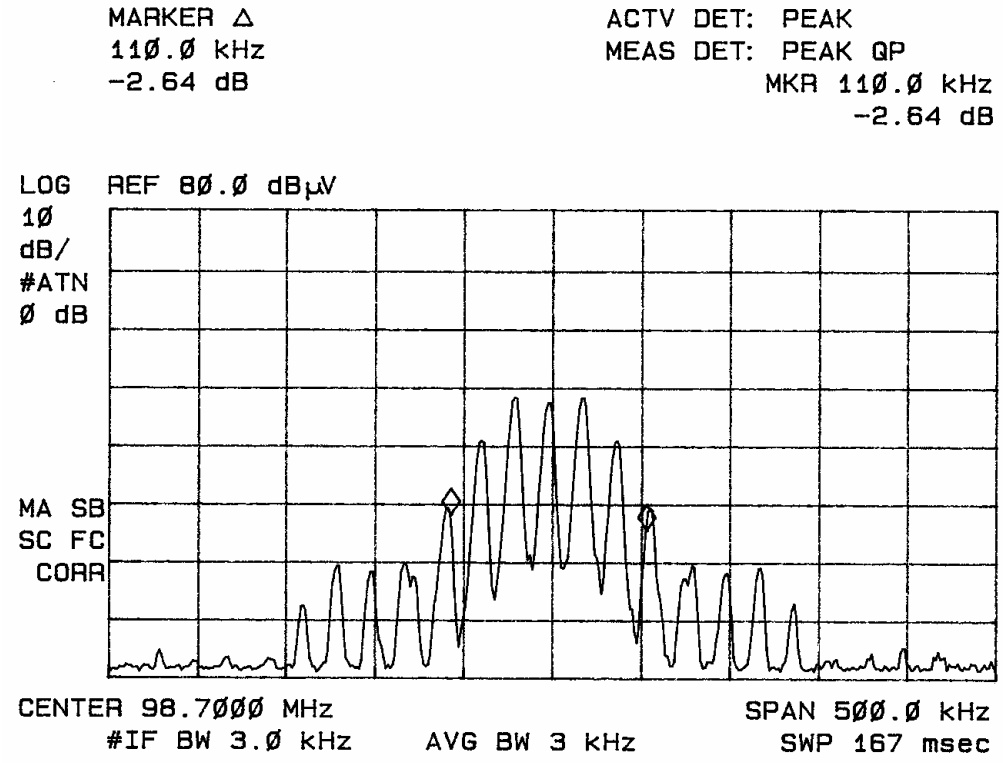


Figure three 200 kHz Occupied Bandwidth requirement

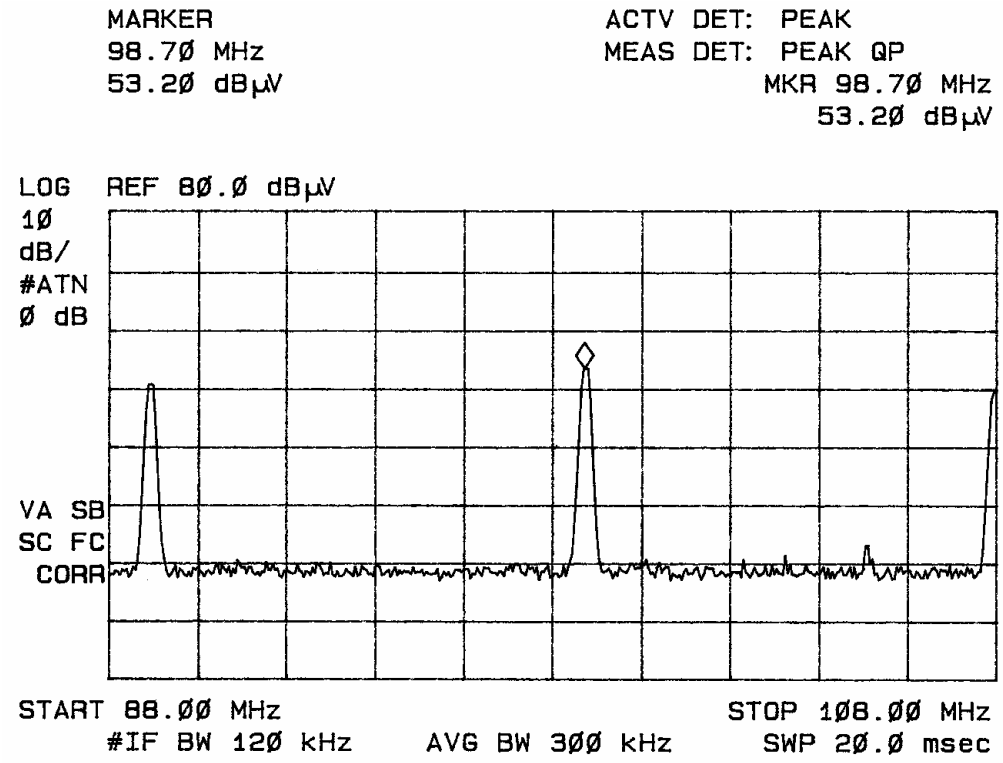


Figure four Output power across the operational band

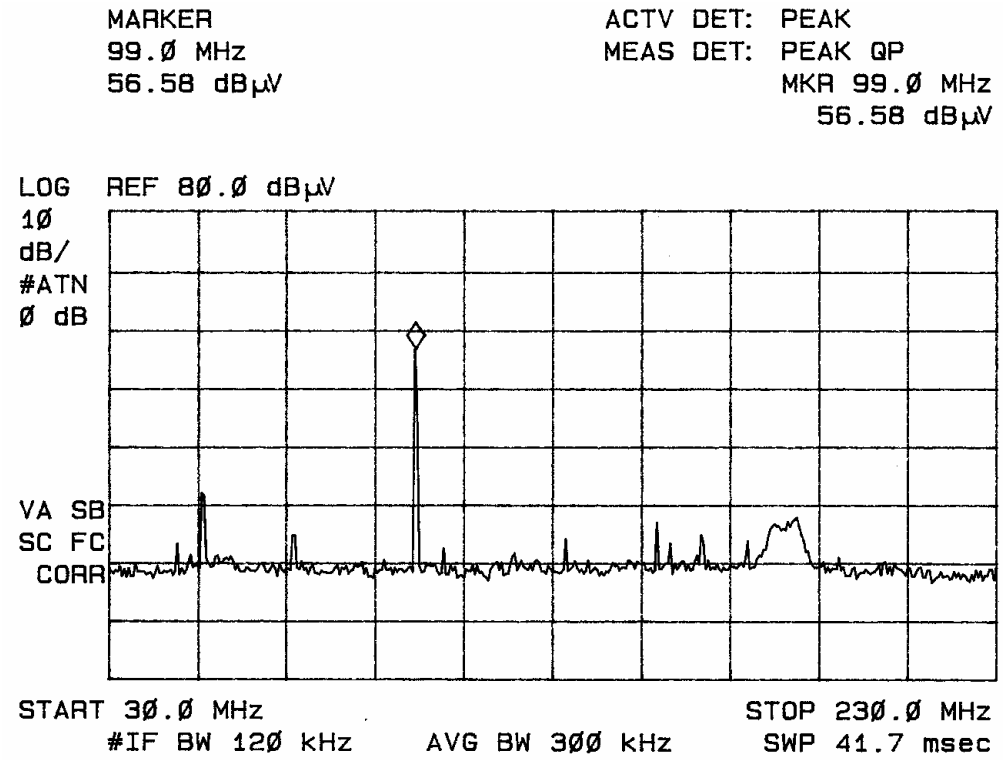


Figure five Radiated Emissions @ 1 Meter in Screen Room

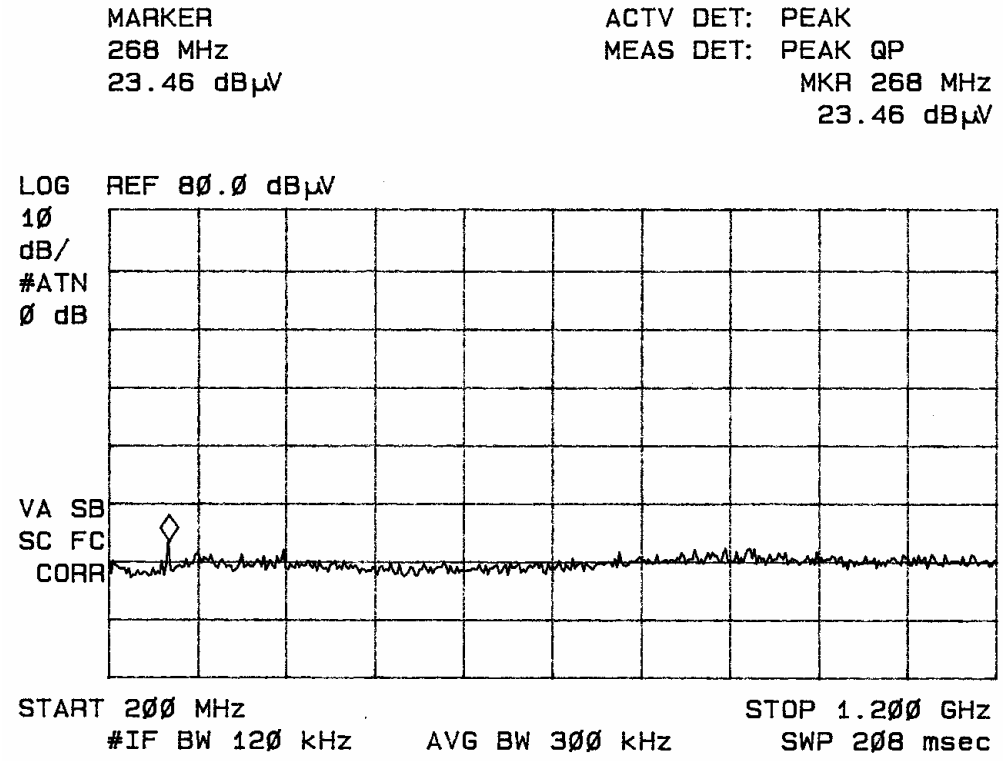


Figure six Radiated Emissions @ 1 Meter in Screen Room

SUMMARY OF RESULTS

Radiated Emissions

The EUT had a 0-dB margin below the limits of 15.239. The radiated emissions for the EUT meet the requirements for FCC CFR 47 Part 15.239 Intentional Radiators. There are no measurable emissions in the restricted bands other than those recorded in this report. Other emissions were present with amplitudes at least 20 dB below the FCC Limits.

Statement of Modifications

No modifications to the EUT were required for the unit to meet the FCC CFR 47 Parts 15B & 15C, Class B Emissions Standards. There were no deviations to the specifications.

APPENDIX

Model: STREETPILOT 7XXX

1. Test Equipment List.
2. Rogers Qualifications.
3. FCC Site Approval Letter.

TEST EQUIPMENT LIST FOR ROGERS LABS, INC.

The test equipment used is maintained in calibration and good operating condition. Use of this calibrated equipment ensures measurements are traceable to national standards.

List of Test Equipment:	Calibration Date:
Scope: Tektronix 2230	2/05
Wattmeter: Bird 43 with Load Bird 8085	2/05
Power Supplies: Sorensen SRL 20-25, SRL 40-25, DCR 150, DCR 140	2/05
H/V Power Supply: Fluke Model: 408B (SN: 573)	2/05
R.F. Generator: HP 606A	2/05
R.F. Generator: HP 8614A	2/05
R.F. Generator: HP 8640B	2/05
Spectrum Analyzer: HP 8562A, Mixers: 11517A, 11970A, 11970K, 11970U, 11970V, 11970W HP Adapters: 11518, 11519, 11520	2/05
Spectrum Analyzer: HP 8591 EM	5/05
Frequency Counter: Leader LDC 825	2/05
Antenna: EMCO Biconilog Model: 3143	5/05
Antenna: EMCO Log Periodic Model: 3147	10/04
Antenna: Antenna Research Biconical Model: BCD 235	10/04
Antenna: EMCO Dipole Set 3121C	2/05
Antenna: C.D. B-101	2/05
Antenna: Solar 9229-1 & 9230-1	2/05
Antenna: EMCO 6509	2/05
Audio Oscillator: H.P. 201CD	2/05
R.F. Power Amp 65W Model: 470-A-1010	2/05
R.F. Power Amp 50W M185- 10-501	2/05
R.F. PreAmp CPPA-102	2/05
LISN 50 µHy/50 ohm/0.1 µf	10/04
LISN Compliance Eng. 240/20	2/05
LISN Fischer Custom Communications FCC-LISN-50-16-2-08	6/05
Peavey Power Amp Model: IPS 801	2/05
Power Amp A.R. Model: 10W 1010M7	2/05
Power Amp EIN Model: A301	2/05
ELGAR Model: 1751	2/05
ELGAR Model: TG 704A-3D	2/05
ESD Test Set 2010i	2/05
Fast Transient Burst Generator Model: EFT/B-101	2/05
Current Probe: Singer CP-105	2/05
Current Probe: Solar 9108-1N	2/05
Field Intensity Meter: EFM-018	2/05
KEYTEK Ecat Surge Generator	2/05
Shielded Room 5 M x 3 M x 3.0 M (101 dB Integrity)	

6/8/2005

QUALIFICATIONS

Of

SCOT D. ROGERS, ENGINEER

ROGERS LABS, INC.

Mr. Rogers has approximately 16 years experience in the field of electronics. Six years working in the automated controls industry and 6 years working with the design, development and testing of radio communications and electronic equipment.

POSITIONS HELD:

Systems Engineer:	A/C Controls Mfg. Co., Inc. 6 Years
Electrical Engineer:	Rogers Consulting Labs, Inc. 5 Years
Electrical Engineer:	Rogers Labs, Inc. Current

EDUCATIONAL BACKGROUND:

1) Bachelor of Science Degree in Electrical Engineering from Kansas State University.

2) Bachelor of Science Degree in Business Administration Kansas State University.

3) Several Specialized Training courses and seminars pertaining to Microprocessors and Software programming.

Scot D Rogers

Scot D. Rogers

August 10, 2005
Date

1/11/03

FEDERAL COMMUNICATIONS COMMISSION

Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

August 15, 2003

Registration Number: 90910

Rogers Labs, Inc.
4405 West 259th Terrace
Louisburg, KS 66053

Attention: Scot Rogers

Re: Measurement facility located at Louisburg
3 & 10 meter site
Date of Renewal: August 15, 2003

Dear Sir or Madam:

Your request for renewal of the registration of the subject measurement facility has been received. The information submitted has been placed in your file and the registration has been renewed. The name of your organization will remain on the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website www.fcc.gov under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,

Ms. Phyllis Parrish
Information Technician