7 May, 2001

Chris Gustaf
Trango Systems
9939 Via Pasar
San Diego, CA 92126

Dear Mr. Gustaf,

Enclosed is the report for the 5.8 GHz 12 Channel Video Transmitter, model VTX5900. Please check it thoroughly for discrepancies This is an official copy of this report complete with the original Acme Testing staff signatures, which should be retained by you as the official record of testing, as it may be required for future verification of compliance. The EMC Directive requires that either the manufacturer or your authorized representative in Europe keep this data for a period of ten (10) years after the equipment was placed on the market. Please be aware that our internal controls require us to keep a historical copy of your report on file for three years only.

Acme Testing is accredited by the American Association for Laboratory Accreditation. There is a current Mutual Recognition Agreement between the United States, Australia, New Zealand, Singapore, and Hong Kong. This means that the data contained in this report is acceptable to the authorities of these countries.

Acme Testing has been nominated by NIST as a Conformity Assessment Body under the US-EU Mutual Recognition Agreement, and we are a registered facility with the Japanese Voluntary Control Council for Interference by Information Technology Equipment (VCCI).

Thank you for your business and we look forward to being of service should you require testing services in the future.

Yours Sincerely,

Steve FitzGerald
President

Enclosures

The following are samples of what the FCC expects to see displayed prominently in your users manual and/or on your FCC ID label (more information can be found in the CFR 47):

§ 15.19 Labelling requirements.

The following is a sample of the statement that must appear on the FCC ID Label that will be place on your product:

COMPANY NAME
FCC ID:
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For devices that are so small that a label can not be affixed upon the product the FCC states: "When the device is so small or for such use that it is not practicable to place the statement specified in this section on it, the information required by these paragraphs shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. **However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.**

§ 15.21 Information to user.

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

PLEASE NOTE: INFORMATION TO THIS EFFECT MUST APPEAR IN THE MANUAL OR THE FCC WILL DENY YOUR APPLICATION FOR EQUIPMENT AUTHORIZATION!!!!

ACME TESTING, 2002 VALLEY HWY, P.O. BOX 3, ACME, WASHINGTON 98220-0003 1-888-226-3837.

REPORT OF MEASUREMENTS
PART 15C (15.249) - INTENTIONAL RADIATORS

DEVICE:	5.8 GHz 12 CHANNEL VIDEO TRANSMITTER
MODEL:	VTX5900
MANUFACTURER:	TRANGO SYSTEMS
ADDRESS:	9939 VIA PASAR SAN DIEGO, CA 92126

THE DATA CONTAINED IN THIS REPORT WAS
COLLECTED ON 5 NOVEMBER 1999 AND COMPILED BY:

PAUL G. SLAVENS
CHIEF EMC ENGINEER

1. General

1.1 Purpose

The purpose of this report is to show compliance to the FCC regulations for unlicensed devices operating under section 15.249 of the Code of Federal Regulations title 47.

1.2 Manufacturer

Company Name:	Trango Systems
Contact:	Chris Gustaf
Street Address:	9939 Via Pasar
City/State/Zip:	San Diego, CA 92126
Telephone:	619 621-2700
Fax:	619 621-2722
Web:	www.trangosys.com

1.3 Test location

Company:	Acme Testing
Street Address:	2002 Valley Highway
Mailing Address:	PO Box 3
City/State/Zip:	Acme WA 98220-0003
Laboratory:	Test Site 2
Telephone:	888 226-3837
Fax:	360 595-2722
E-mail:	acmetest@acmetesting.com
Web:	www.acmetesting.com
Receipt of EUT:	5 November 1999

1.4 Test Personnel

Paul Slavens

2. Test Results Summary

Summary of Test Results

Test Specification	Test Description	Compliance Criteria	Status
FCC CFR 47, PART 15C, 15.249	**Radiated Emissions** 30 MHz – 40 GHz	**15.249**	**Pass**
FCC CFR 47, PART 15C, 15.207(a)	**Conducted Emissions** 0.45 MHz - 30 MHz	**15.207(a)**	**Pass**

The signed original of this report, supplied to the client, represents the only "official" copy. Retention of any additional copies (electronic or non-electronic media) is at Acme Testing's discretion to meet internal requirements only. The client has made the determination that EUT Condition, Characterization, and Mode of Operation are representative of production units, and meet the requirements of the specifications referenced herein.

Consistent with Industry practice, measurement and test equipment not directly involved in obtaining measurement results but having an impact on measurements (such as cable loss, antenna factors, etc.) is factored into the "Correction Factor" documented in certain test results. Instrumentation employed for testing meets tolerances consistent with known Industry Standards and Regulations.

The measurements contained in this report were made in accordance with the referenced standards and all applicable Public Notices received prior to the date of testing. Acme Testing assumes responsibility only for the accuracy and completeness of this data as it pertains to the sample tested.

Paul G. Slavens
Chief EMC Engineer

Date of Issuance

2.1 Manufacturer's Statement of Responsibility

This equipment has been tested in accordance with the requirements contained in the appropriate Commission regulations. To the best of my knowledge, these tests were performed using measurement procedures consistent with industry or Commission standards and demonstrate that the equipment complies with the appropriate standards. Each unit manufactured, imported or marketed, as defined in the Commission's regulations, will conform to the sample(s) tested within the variations that can be expected due to quantity production and testing on a statistical basis. I further certify that the necessary measurements were made by:

Acme Testing
2002 Valley Highway
P.O. Box 3
Acme, Washington 98220-0003
360-595-2785

_____
Signature

_____
Title

3. Description of Equipment and Peripherals

3.1 Equipment Under Test (EUT)

Device:	5.8 GHz 12 Channel Video Transmitter
Model Number:	VTX5900
Serial Number:	None
FCC ID:	NCYVTX5900
Power:	120 V/60 Hz
Grounding:	Local

3.2 EUT Peripherals

Device	Manufacturer	Model Number	FCC ID	Serial Number
Laptop Computer	IBM Corporation	2626-2E9	ANOKAJIPENCP	78-DFNF5 96/12
PAL/NTSC Signal Generator	Textronix	Pathfinder	None	B024509

3.3 Description of Interface Cables for Emissions

EUT/ Laptop Computer

Shielded	Unshielded	Flat	Round	Length	Ferrite
No	Yes	Yes	No	1 m	No

ARRANGEMENT OF INTERFACE CABLES: All interface cables were positioned for worst case maximum emissions within the manner assumed to be a typical operation condition (please reference photographs).

3.4 The Mode of Operation During Tests for Emissions

The EUT was exercised by constantly transmitting. The EUT was modulated with input from PAL/NTSC signal generator outputting FCC composite video signal and a 1kHz audio tone.

3.5 Modifications Required for Compliance

The EUT required the following modifications during testing to bring the product into compliance.

1. None.

4. Antenna requirement FCC CFR 47, Part 15C, 15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

The EUT uses a unique coupling device for the antenna. The EUT's antenna is a reverse-threaded SMA connector specifically designed for FCC compliance.

5. Radiated Emissions Tests

Test Requirement: FCC CFR 47, PART 15C, 15.249

Test Procedure: ANSI C63.4:1992

5.1 Test Equipment

Spectrum Analyzer: Hewlett-Packard 8566B, Serial Number 2410A-00168, Calibrated: 12 March 1999, Calibration due Date: 12 March 2000

RF Preselector: Hewlett-Packard 85685, Serial Number 2648A-00519, Calibrated: 12 March 1999, Calibration due Date: 12 March 2000

Quasi Peak Adapter: Hewlett-Packard 85650A, Serial Number 2043A-00327, Calibrated: 17 March 1999, Calibration due Date: 17 March 2000

Line Impedance Stabilization Network: Rhode & Schwarz ESH2-Z5, Serial Number ACMERS1, Calibrated: 1 September 1999, Calibration due Date: 1 September 2000

Broadband Biconical Antenna (20 MHz to 200 MHz): EMCO 3110, Serial Number 1115, Calibrated: 28 September 1999, Calibration due Date: 28 September 2000

Broadband Log Periodic Antenna (200 MHz to 1000 MHz): EMCO 3146, Serial Number 2853, Calibrated: 10 October 1999, Calibration due Date: 10 October 2000

EUT Turntable Position Controller: EMCO 1061-3M, Serial Number 9003-1441, No Calibration Required

Antenna Mast: EMCO 1051, Serial Number 9002-1457, No Calibration Required

2 GHz to 10 GHz Low Noise Preamplifier: Milliwave 593-2898, Serial Number 2494, Calibrated: 22 January 1999, Calibration due Date: 22 January 2000

Double Ridge Guide Horn Antenna: EMCO 3115, Serial Number 9807-5534, Calibrated: 28 December 1998, Calibration due Date: 28 December 1999

Mixer: Hewlett-Packard 11970A, Serial Number 3003A0822, Calibrated: 25 June 1999, Calibration due Date: 25 December 2000

Mixer: Hewlett-Packard 11970K, Serial number 3003A05434, Calibrated: 27 September 1999, Calibration Due Date: 27 March 2001

Amplifier: Hewlett-Packard 11975A, Serial Number 2517A00873, Calibrated: 15 October 1999, Calibration Due Date: 15 October 2000

5.2 Purpose

The purpose of this test is to evaluate the radiated electromagnetic interference characteristics of the EUT.

5.3 Test Procedures

For tabletop equipment, the EUT is placed on a 1 meter by 1.5 meters wide and 0.8 meter high nonconductive table that sits on a flush mounted metal turntable. Floor standing equipment is placed directly on the flush mounted metal turntable. The EUT is connected to its associated peripherals with any excess I/O cabling bundled to approximately 1 meter.

Preview tests are performed to determine the "worst case" mode of operation. With the EUT operating in "worst case" mode, emissions from the unit are maximized by adjusting the polarization and height of the receive antenna and rotating the EUT on the turntable. EUT emissions are also maximized by manipulating the system cables.

Radiated Emissions Test Characteristics	
Frequency range	30 MHz – 40 GHz
Test distance	3 meters (30 MHz – 18 GHz) 1 meter (18 GHz – 40 GHz)
Test instrumentation resolution bandwidth	120 kHz (30 MHz-1 GHz) 1 MHz (1 GHz – 40 GHz)
Receive antenna scan height	1 - 4 meters
Receive antenna polarization	Vertical/Horizontal

5.4 Test Results

CHANNEL 1 FUNDAMENTAL PEAK
PRODUCT EMISSIONS

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORRECTION FACTOR
1	5738.99	114.0	99.3	5.3	PK	V	141	0	10.1

CHANNEL 6 FUNDAMENTAL PEAK
PRODUCT EMISSIONS

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORRECTION FACTOR
4	5791.88	114.0	100.	6.0	PK	V	136	0	10.2

CHANNEL 12 FUNDAMENTAL PEAK
PRODUCT EMISSIONS

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORRECTION FACTOR
7	5858.92	114.0	99.2	5.2	PK	V	134	0	10.3

CHANNEL 1 FUNDAMENTAL AVERAGE
PRODUCT EMISSIONS

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORRECTION FACTOR
3	5739.98	94.0	89.7	-4.3	AVG	V	141	0	10.1

CHANNEL 6 FUNDAMENTAL AVERAGE
PRODUCT EMISSIONS

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORRECTION FACTOR
6	5794.14	94.0	88.5	-5.5	AVG	V	136	0	10.2

CHANNEL 12 FUNDAMENTAL AVERAGE
PRODUCT EMISSIONS

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORRECTION FACTOR
8	5858.94	94.0	86.0	-8.1	AVG	V	128	0	10.3

CHANNEL 1 FUNDAMENTAL AVERAGE WITH NO VIDEO
PRODUCT EMISSIONS

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS dBuV/m	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORRECTION FACTOR
2	5739.90	94.0	90.0	-4.0	AVG	V	141	0	10.1

CHANNEL 6 FUNDAMENTAL AVERAGE WITH NO VIDEO
PRODUCT EMISSIONS

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS dBuV/m	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORRECTION FACTOR
5	5793.88	94.0	81.8	-12.2	AVG	V	141	0	10.2

CHANNEL 12 FUNDAMENTAL AVERAGE WITH NO VIDEO
PRODUCT EMISSIONS

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS dBuV/m	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORRECTION FACTOR
5	5793.88	94.0	82.3	-11.7	AVG	V	141	0	10.2

CHANNEL 1 SPURIOUS PEAK
PRODUCT EMISSIONS

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORRECTION FACTOR
1	1434.75	74.0	54.0	-0.0	PK	H	127	0	26.6
2	2870.79	74.0	51.8	-2.2	PK	H	105	0	3.3
3	4306.02	74.0	50.0	-4.0	PK	H	129	0	6.3
4	11477.6	74.0	58.7	4.7	PK	V	126	0	14.2

CHANNEL 6 SPURIOUS PEAK
PRODUCT EMISSIONS

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORRECTION FACTOR
1	1448.05	74.0	53.5	-0.5	PK	H	125	0	26.6
2	2896.35	74.0	51.9	-2.1	PK	H	145	0	3.4
3	4344.52	74.0	48.3	-5.7	PK	H	127	0	6.3
4	11590.8	74.0	59.4	5.4	PK	V	133	0	14.3

CHANNEL 12 SPURIOUS PEAK
PRODUCT EMISSIONS

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORRECTION FACTOR
1	1464.85	74.0	53.8	-0.2	PK	H	120	0	26.6
2	2929.76	74.0	49.6	-4.4	PK	H	146	0	3.5
3	4394.34	74.0	49.3	-4.7	PK	H	149	0	6.4
4	11723.1	74.0	56.5	2.5	PK	V	129	0	14.3

CHANNEL 1 SPURIOUS AVERAGE
PRODUCT EMISSIONS

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORRECTION FACTOR
1	1434.97	54.0	51.5	-2.5	AVG	H	127	0	26.6
2	2869.95	54.0	45.9	-8.1	AVG	H	105	0	3.3
3	4304.22	54.0	40.9	-13.1	AVG	H	129	0	6.3
4	11477.8	54.0	46.1	-7.9	AVG	V	126	0	14.2

CHANNEL 6 SPURIOUS AVERAGE
PRODUCT EMISSIONS

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORRECTION FACTOR
1	1448.30	54.0	50.6	-3.4	AVG	H	125	0	26.6
2	2896.94	54.0	46.4	-7.6	AVG	H	145	0	3.4
3	4345.48	54.0	38.7	-15.3	AVG	H	127	0	6.3
4	11585.7	54.0	46.3	-7.7	AVG	V	133	0	14.3

CHANNEL 12 SPURIOUS AVERAGE
PRODUCT EMISSIONS

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORRECTION FACTOR
1	1464.96	54.0	51.3	-2.7	AVG	H	120	0	26.6
2	2929.96	54.0	43.2	-10.8	AVG	H	146	0	3.5
3	4394.38	54.0	39.0	-15.0	AVG	H	149	0	6.4
4	11717.7	54.0	44.4	-9.6	AVG	V	129	0	14.3

6. Conducted Emissions Tests

Test Requirement: CFR 47, Part 15C, 15.207(a)

Test Procedure: ANSI C63.4:1992

6.1 Test Equipment

Spectrum Analyzer: Hewlett-Packard 8566B, Serial Number 2410A-00168, Calibrated: 12 March 1999, Calibration due Date: 12 March 2000

RF Preselector: Hewlett-Packard 85685, Serial Number 2648A-00519, Calibrated: 12 March 1999, Calibration due Date: 12 March 2000

Quasi Peak Adapter: Hewlett-Packard 85650A, Serial Number 2043A-00327, Calibrated: 17 March 1999, Calibration due Date: 17 March 2000

Line Impedance Stabilization Network: Rhode & Schwarz ESH2-Z5, Serial Number ACMERS1, Calibrated: 1 September 1999, Calibration due Date: 1 September 2000

6.2 Purpose

The purpose of this test is to evaluate the level of conducted noise the EUT imposes on the A/C mains.

6.3 Test Procedures

For tabletop equipment, the EUT is placed on a 1 meter by 1.5 meters wide and 0.8 meter high nonconductive table that is placed above the groundplane. Floor standing equipment is placed directly on the groundplane. Any supplemental grounding mechanisms are connected, if appropriate. The EUT is connected to its associated peripherals, with any excess I/O cabling bundled to approximately 1 meter. The EUT is connected to a dedicated LISN and all peripherals are connected to a second separate LISN circuit. The LISNs are bonded to the groundplane.

Preview tests are performed to determine the “worst case” mode of operation. With the EUT operating in “worst case” mode, final conducted measurements are taken. Conducted measurements are made on each current carrying conductor with respect to ground.

Conducted Emissions Test Characteristics	
Frequency range	0.45 - 30.0 MHz
Test instrumentation resolution bandwidth	9 kHz
Lines Tested	Line 1/Line 2

6.4 Test Results

Summaries of the highest amplitude emissions are listed below. For detailed plots of all emissions from 0.45 MHz - 30 MHz, please refer to the accompanying data in the list of attachments.

LINE 1

PEAK #	FREQ (MHz)	AMPL (dBuV)
1	0.4792	35.2
2	0.4894	34.9
3	0.4977	34.4
4	0.5322	33.4
5	0.6817	32.5
6	0.7414	32.6

LINE 2

PEAK #	FREQ (MHz)	AMPL (dBuV)
1	0.4576	37.5
2	0.4956	37.2
3	0.6676	33.9
4	1.077	31.4
5	15.99	31.0
6	16.53	31.0
7	16.81	32.2

7. Miscellaneous Comments and Notes

1. None

8. List of Attachments

1. Plots of all band edge (4)
2. Plots of all conducted emissions. (2)
3. Photographs of test set-ups. (4)