ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT
CLASS II PERMISSIVE CHANGE

TEST REPORT

FOR

5.8 GHZ WIRELESS VIDEO / AUDIO / ALARM / DATA TRANSMITTER

FCC ID: NCYVTX5900

MODEL NO: VTX5900

REPORT NO: 01U1103-1

ISSUE DATE: FEBRUARY 6, 2002

Prepared for
TRANGO SYSTEMS, INC.
9939 VIA PASAR
SAN DIEGO, CA 92126 – 4559, U.S.A.

Prepared by
COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD
MORGAN HILL, CA 95037, U.S.A.
TEL: (408) 463-0885
FAX: (408) 463-0888

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1. VERIFICATION OF COMPLIANCE

COMPANY NAME: TRANGO SYSTEMS, INC.
9939 VIA PASAR
SAN DIEGO, CA 92126 – 4559, U.S.A.

CONTACT PERSON: CHRISTOPHER GUSTAF

TELEPHONE NUMBER: (858) 653 - 3900

EUT DESCRIPTION: 5.8 GHZ VIDEO / AUDIO / ALARM / DATA TRANSMITTER

MODEL NAME: VTX5900

DATE TESTED: 12/20/2001, 12/27/2001, 2/26/2002

LIMITS APPLY TO: FCC PART 15 SECTION 15.249	
TECHNICAL LIMITS	**TEST RESULT**
Radiated Emission of Fundamental Frequency	No non-compliance found
Radiated Emission of Harmonic Frequency	No non-compliance found
Radiated Emission Outside the Band	No non-compliance found
LIMITS APPLY TO: FCC PART 15 SECTION 15.209	
Radiated Emission Digital Device	No non-compliance found
LIMITS APPLY TO: FCC PART 15 SECTION 15.207	
AC Line Conducted Emission	No non-compliance found

The above equipment was tested by Compliance Certification Services Inc. for compliance with the requirements set forth in CFR 47 PART 15 SUBPART C. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

Tested by:
Thu Chan / Senior EMC Engineer
Compliance Certification Services

Reviewed by:
Steve Cheng / Engineering Manager
Compliance Certification Services

Warning : This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

2. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

The EUT is a professional quality system designed for sending composite NTSC or PAL video, audio and alarm signals using 5.8GHz wireless technology.

CHASSIS TYPE	**METAL**
Frequency Range	**5740 – 5860 MHz**
Number of Channels	**14**
Type of Emission	**CONTINUOUS**
Antenna Requirement	**UNIQUE CONNECTOR (INVERSE SMA CONNECTOR)**
Antenna Gain	**16 dBi**
No of External Connectors and Types	**1 BNC, 2RCA, 1 RJ11, 1 Terminal Block**
Power requirement	**7V DC ADAPTER**

Class II Permissive Change:

1. Repackage the PLL components under a single shield.
2. Authorize use of a new patch antenna with same gain as helical on the original grant.

3. TEST LOCATION

All emissions tests were performed at:

Compliance Certification Services
561F Monterey Road
Morgan Hill, CA 95037

CCS has site descriptions on file with the FCC for 10 and 3 meter site configurations. CCS is a NVLAP accredited facility.

4. EQUIPMENT MODIFICATIONS

To achieve compliance Levels, the following change(s) were made during compliance testing:

No changes were required in order to achieve compliance to class B levels.

5. TEST RESULT SUMMARY

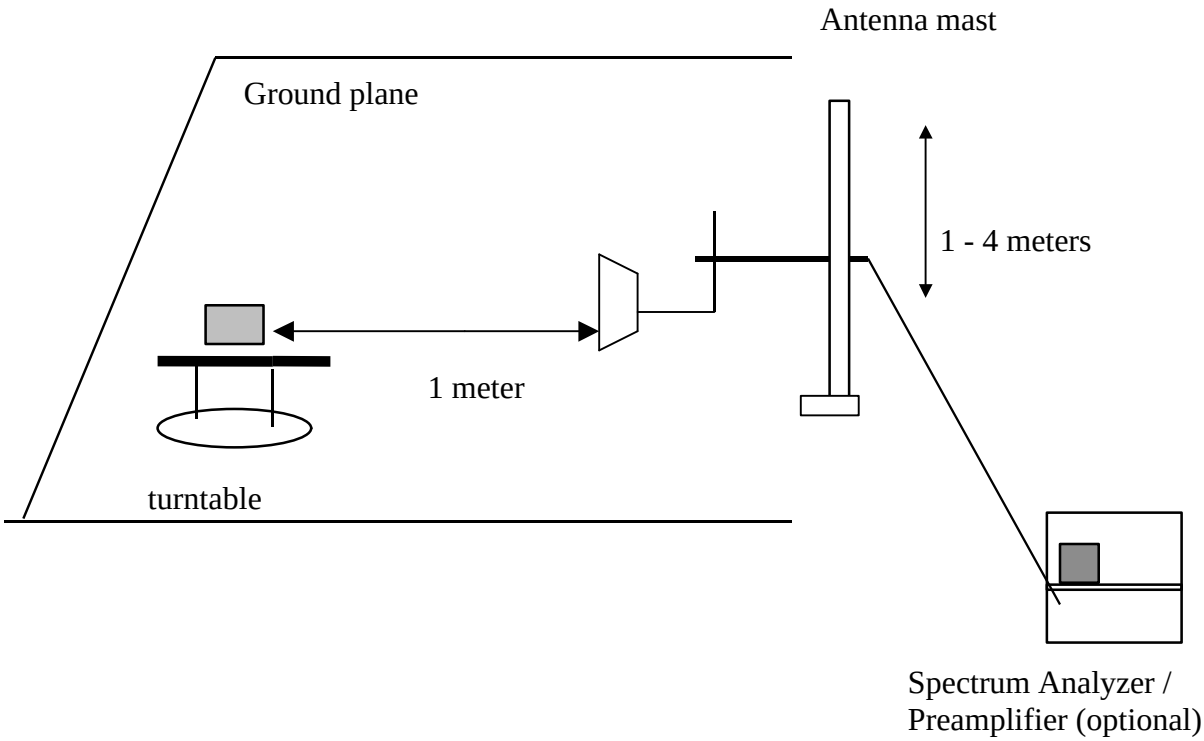
Radiated Emissions

Test Requirement: 15.249(A)(B)(C)

Measurement Equipment Used:

HP Spectrum Analyzer / 8566B (Cal Due: 5/4/02)
HP Spectrum Display / 85662A (Cal Due: 5/4/02)
HP Quasi-Peak Detector / 85650A (Cal Due: 5/4/02)
HP Pre-Amp (P1) / 8447D (Cal Due: 8/21/02)
CHASE Bilog Antenna / CBL6112 (Cal Due: 8/2/02)
EMCO Horn Antenna / 3115 (Cal Due: 6/20/02)
ARA Horn Antenna / MWH 1826 (Cal Due: 7/26/02)
HP EMC Receiver / 8593EM (Cal Due: 6/20/02)
MITEQ Pre-Amp (1 – 26GHz) / NSP2600-44 (Cal Due: 4/12/02)
HP Microwave Amplifier (2 – 8GHz) / 11975A (Cal Due: 8/23/02)
HP Harmonic Mixer & Horn Antenna (26.5 – 40GHz) / 11970A (Cal Due: 9/23/02)
HP Harmonic Mixer & Horn Antenna (33 – 50GHz) / 1197Q (Cal Due: 6/26/03)
FLEXCO SMA able / 20761; 16ft. Cable (loss: .9dB/ft @ 26GHz)
High Pass Filter FSY(7.6 GHz) / 001

TEST SETUP FOR MEASUREMENT OF FUNDAMENTAL FREQUENCY & HARMONIC



Test Procedures

1) Place the EUT on the turntable as shown. The EUT was placed as close as possible to the center of the turntable with the axis of rotation going through the EUT antenna when in vertical or horizontal polarization. Activated Eut to transmit.

2) The Horn search antenna was place at a distance of 1 meters. The antenna was raised and lowered and the EUT rotated on the turntable to produce maximum emission levels on the spectrum analyzer.

3) The EUT was placed standing-up.

Setup Photo & Test Results:

02/06/02 FCC Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Equipment for 1-22 GHz
HP8566B Analyzer
Miteq NSP2600-44 Preamp
EMCO 3115 Antenna
Cable: 16.0 feet
FCC Measurement

Equipment for 22 - 58 GHz
HP8566B Analyzer
HP 11975A Amplifier (LO)
HP 11970K External mixer/antenna
Cable: IF Only (321 MHz)

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

Peak Measurements:
1MHz Resolution Bandwidth
1MHz Video Bandwidth

EUT S/N: **Low Channel**
VTX5900 with Patch Antenna

f GHz	Dist feet	Read Peak dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Peak Lim dBuV/m	Avg Lim dBuV/m	Peak Mar dB	Avg Mar dB	Notes
5.739	3.3	79.3	61.5	34.4	6.8	0.0	-9.5	0.0	111.0	93.2	114.0	94.0	-3.0	-0.8	V
5.739	3.3	79.0	61.3	34.4	6.8	0.0	-9.5	0.0	110.7	93.0	114.0	94.0	-3.3	-1.0	H
5.725	3.3	40.0	20.0	34.4	6.8	0.0	-9.5	0.0	71.7	51.7	74.0	54.0	-2.3	-2.3	V
11.478	3.3	63.8	50.5	39.1	9.9	-39.6	-9.5	1.0	64.7	51.4	74.0	54.0	-9.3	-2.6	V
11.478	3.3	63.6	50.3	39.1	9.9	-39.6	-9.5	1.0	64.5	51.2	74.0	54.0	-9.5	-2.8	H
17.217	3.3	52.0	39.5	44.1	13.3	-44.1	-9.5	1.0	56.8	44.3	74.0	54.0	-17.2	-9.7	Noise Floor
22.955	1.5	53.1	42.0	32.4	16.6	-44.3	-16.3	1.0	42.5	31.4	74.0	54.0	-31.5	-22.6	Noise Floor
28.695	1.0	28.4	28.4	33.4	0.0	0.0	-19.9	0.0	41.9	41.9	74.0	54.0	-32.1	-12.1	Noise Floor

* No other emissions were found within 20dB under the FCC limits up to 10 Harmonics.

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

Low Channel

02/06/02 FCC Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Equipment for 1-22 GHz
HP8566B Analyzer
Miteq NSP2600-44 Preamp
EMCO 3115 Antenna
Cable: 16.0 feet
FCC Measurement

Equipment for 22 - 58 GHz
HP8566B Analyzer
HP 11975A Amplifier (LO)
HP 11970K External mixer/antenna
Cable: IF Only (321 MHz)

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

Peak Measurements:
1MHz Resolution Bandwidth
1MHz Video Bandwidth

EUT S/N: **Mid Channel**
VTX5900 with Patch Antenna

f	Dist	Read Peak	Read Avg.	AF	CL	Amp	D Corr	HPF	Peak	Avg	Peak Lim	Avg Lim	Peak Mar	Avg Mar	Notes
GHz	feet	dBuV	dBuV	dB/m	dB	dB	dB		dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	
5.808	3.3	79.3	61.3	34.4	6.9	0.0	-9.5	0.0	111.1	93.1	114.0	94.0	-2.9	-0.9	V
5.808	3.3	79.2	61.2	34.4	6.9	0.0	-9.5	0.0	111.0	93.0	114.0	94.0	-3.0	-1.0	H
11.615	3.3	63.0	51.0	39.2	9.9	-39.7	-9.5	1.0	62.9	51.9	74.0	54.0	-11.1	-2.1	V
11.615	3.3	65.4	52.0	39.2	9.9	-39.7	-9.5	1.0	65.3	52.9	74.0	54.0	-8.7	-1.1	H
17.420	3.3	51.8	39.4	45.7	13.4	-44.1	-9.5	1.0	57.2	45.8	74.0	54.0	-16.8	-8.2	Noise Floor
23.226	1.5	53.8	41.8	32.4	16.8	-44.3	-16.3	1.0	42.3	31.3	74.0	54.0	-31.7	-22.7	Noise Floor
29.040	1.0	28.5	28.5	33.4	0.0	0.0	-19.9	0.0	42.0	42.0	74.0	54.0	-32.0	-12.0	Noise Floor

* No other emissions were found within 20dB under the FCC limits up to 10 Harmonics.

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

Middle Channel

02/06/02 FCC Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Equipment for 1-22 GHz
HP8566B Analyzer
Miteq NSP2600-44 Preamp
EMCO 3115 Antenna
Cable: 16.0 feet
FCC Measurement

Equipment for 22 - 58 GHz
HP8566B Analyzer
HP 11975A Amplifier (LO)
HP 11970K External mixer/antenna
Cable: IF Only (321 MHz)

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

Peak Measurements:
1MHz Resolution Bandwidth
1MHz Video Bandwidth

EUT S/N: **High Channel**
VTX5900 with Patch Antenna

f	Dist	Read Peak	Read Avg.	AF	CL	Amp	D Corr	HPF	Peak	Avg	Peak Lim	Avg Lim	Peak Mar	Avg Mar	Notes
GHz	feet	dBuV	dBuV	dB/m	dB	dB	dB		dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	
5.859	3.3	79.5	61.3	34.5	6.9	0.0	-9.5	0.0	111.4	93.2	114.0	94.0	-2.6	-0.8	V
5.859	3.3	79.0	61.1	34.5	6.9	0.0	-9.5	0.0	110.9	93.0	114.0	94.0	-3.1	-1.0	H
5.875	3.3	35.5	20.0	34.5	6.9	0.0	-9.5	0.0	67.4	51.9	74.0	54.0	-6.6	-2.1	V
11.718	3.3	61.6	49.7	39.1	10.0	-39.8	-9.5	1.0	62.4	50.5	74.0	54.0	-11.6	-3.5	V
11.724	3.3	63.0	51.4	39.1	10.0	-39.8	-9.5	1.0	63.8	52.2	74.0	54.0	-10.2	-1.8	H
17.586	3.3	52.3	39.3	46.4	13.5	-44.2	-9.5	1.0	59.5	46.5	74.0	54.0	-14.5	-7.5	Noise Floor
23.439	1.5	51.9	41.9	32.3	17.0	-44.3	-16.3	1.0	41.5	31.5	74.0	54.0	-32.5	-22.5	Noise Floor
29.311	1.0	29.0	29.0	33.4	0.0	0.0	-19.9	1.0	43.5	43.5	74.0	54.0	-30.5	-10.5	Noise Floor

* No other emissions were found within 20dB under the FCC limits up to 10 Harmonics.

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

High Channel

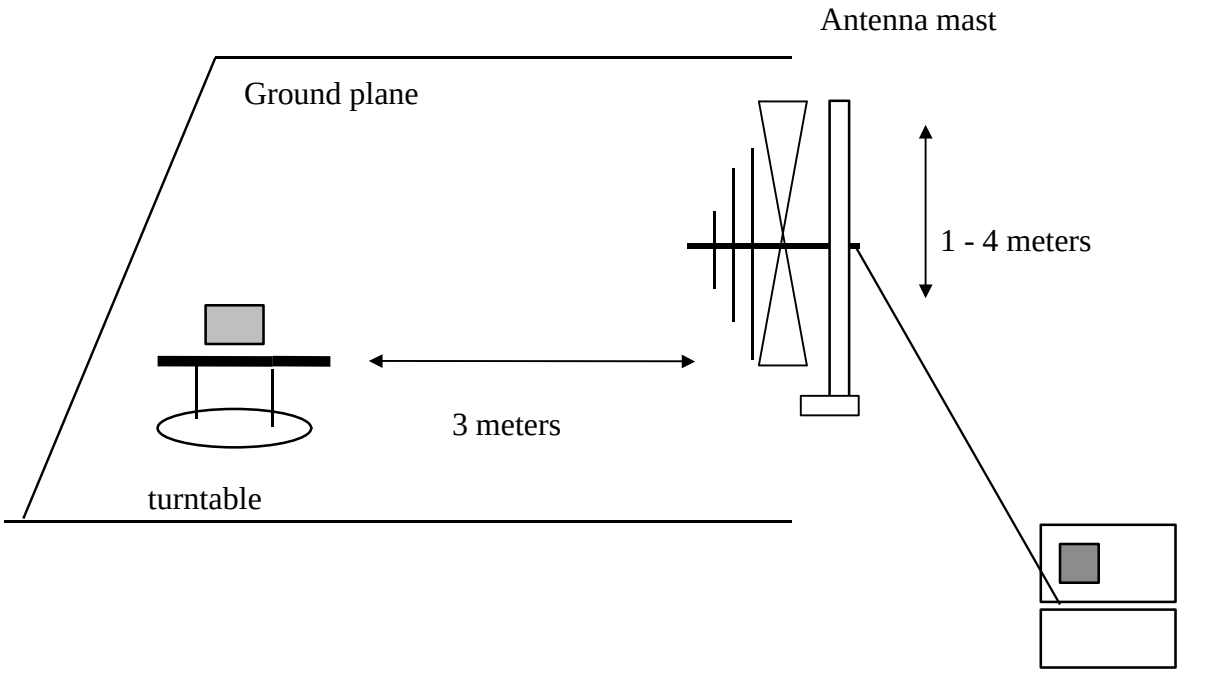
Radiated Emissions

Test Requirement: 15.209

Measurement Equipment Used:

HP Spectrum Analyzer / 8566B (Cal Due: 5/4/02)
HP Spectrum Display / 85662A (Cal Due: 5/4/02)
HP Quasi-Peak Detector / 85650A (Cal Due: 5/4/02)
HP Pre-Amp (P1) / 8447D (Cal Due: 8/21/02)
CHASE Bilog Antenna / CBL6112 (Cal Due: 8/2/02)

TEST SETUP FOR MEASUREMENT OF DIGITAL DEVICE



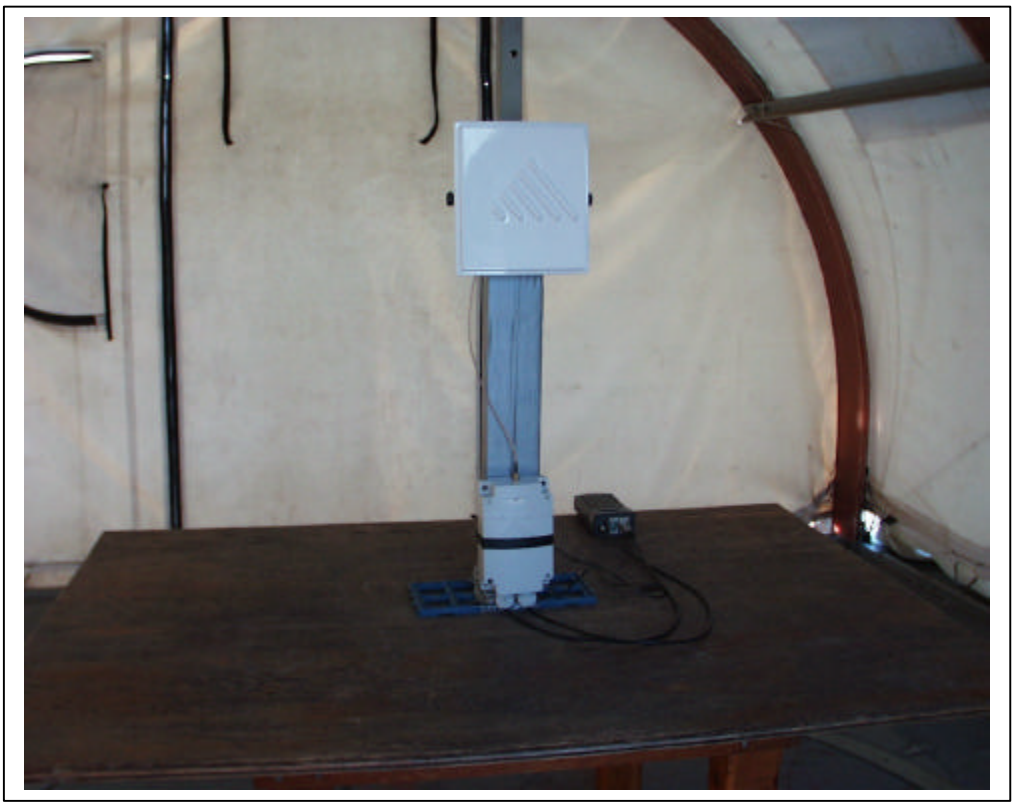
Test Procedures

1) Place the EUT on the turntable as shown. The EUT was placed as close as possible to the center of the turntable with the axis of rotation going through the EUT antenna when in vertical or horizontal polarization. Activated Eut to transmit.

2) The Bilog search antenna was place at a distance of 3 meters. The antenna was raised and lowered and the EUT rotated on the turntable to produce maximum emission levels on the spectrum analyzer.

3) The EUT was placed standing-up (x-axis).

Test Setup Photos & Results:



COMPLIANCE Certification Services

FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

561F MONTEREY ROAD, SAN JOSE, CA 95037-9001
PHONE: (408) 463-0885 FAX: (408) 463-0888

Project #: 01U1103-1
Report #: 011227A1
Date& Time: 12/27/01 11:03 AM
Test Engr: Jesse Saldivar

Company: Trango Systems, Inc.
EUT Description: 5.8GHz Wireless Video / Audio / Data Transmitter
Test Configuration : EUT/ Video & Audio Signerator
Type of Test: FCC Class B
Mode of Operation: Video & Audio Transmitting Continuously

<< Main Sheet

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
216.00	57.80	12.32	1.96	27.17	44.92	46.00	-1.08	3mH	270.00	1.50	P
432.00	49.70	17.59	2.97	28.00	42.26	46.00	-3.74	3mH	0.00	1.50	P
324.00	50.00	15.11	2.50	27.24	40.37	46.00	-5.63	3mH	180.00	1.50	P
229.50	52.00	12.98	2.02	27.12	39.88	46.00	-6.12	3mH	180.00	2.00	P
108.00	49.00	12.12	1.38	27.54	34.96	43.50	-8.54	3mV	0.00	1.00	P
324.00	45.70	15.51	2.50	27.24	36.47	46.00	-9.53	3mV	180.00	1.00	P
6 Worst Data											

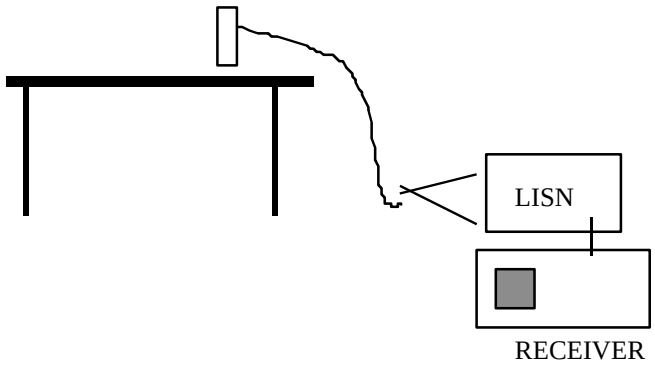
AC Line Conducted Emissions

Test Requirement: 15.207

Measurement Equipment Used:

Rhode & Schwarz EMI Receiver / ESHS-20 (Cal Due: 4/2/02)
Fischer Custom Communication LISN / FCC-LISN-50/250-25-2 (Cal Due: 8/8/02)
Electro Magnetic Line Filter / LMF 1393 (N.C.R.)

Test Set-up

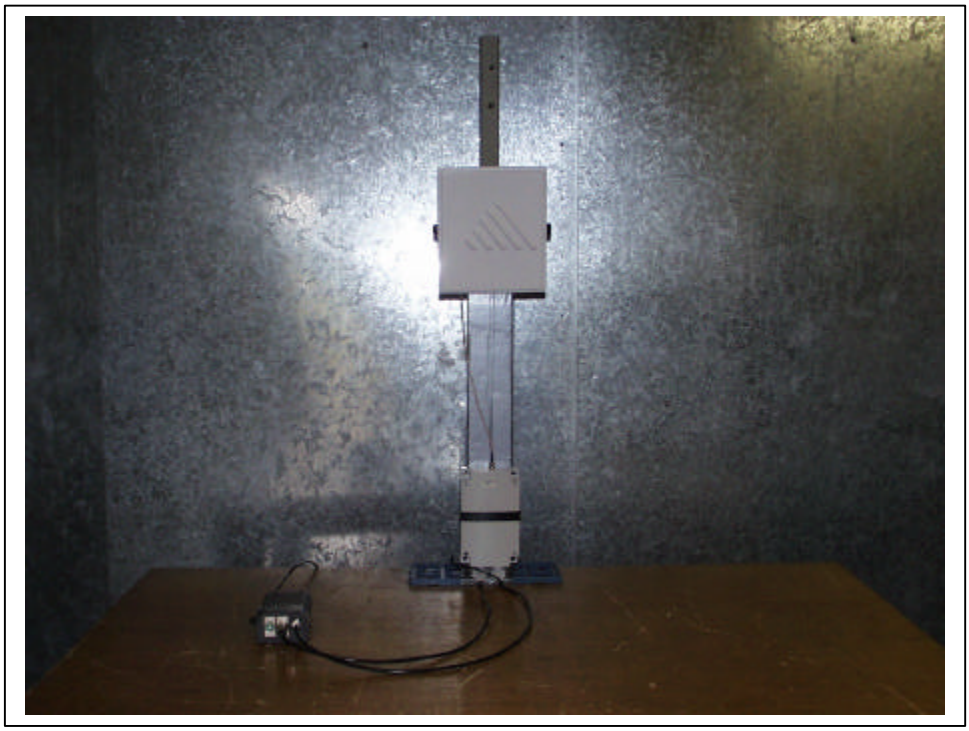


Test Procedure

1. The DC is supplied by a AC adapter. The EUT was placed on a wooden table 40 cm from a vertical ground plane and approximately 80 cm above the horizontal ground plane on the floor. The EUT was set to transmit in a normal tone and charge the battery at the same time.

2. Line conducted data was recorded for both NEUTRAL and HOT lines.

Test Setup Photos & Results:



561F Monterey Road
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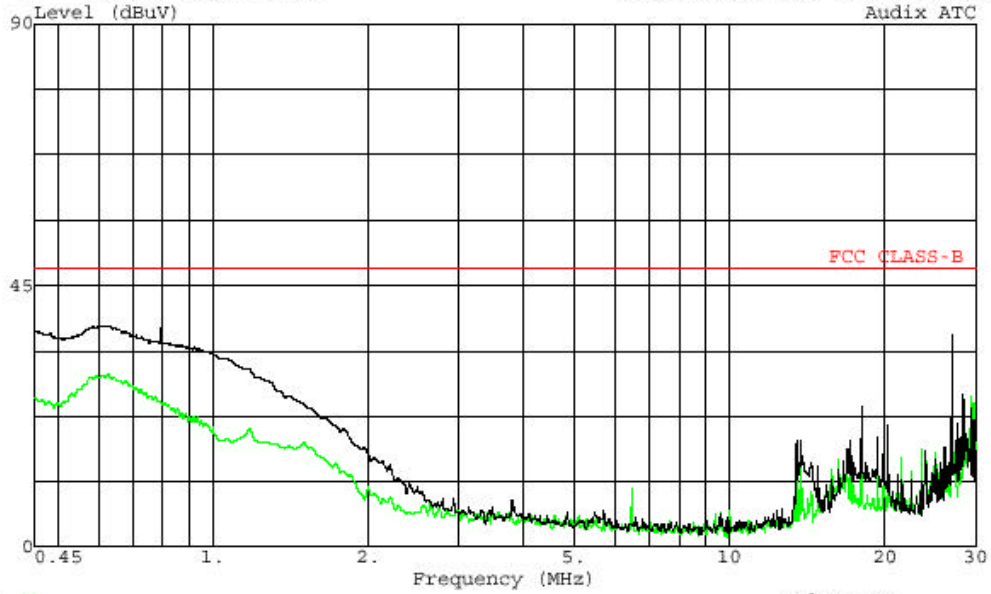
Data#: 14 File#: 011220LC.EMI Date: 12-20-2001 Time: 13:58:45



Trace: 10 Ref Trace:

Report	: 011220LC
Project#	: 01U1103-1
Tested By	: Thu Chan
Manufacture	: Trango Systems, Inc.
EUT Description	: Video/Audio/Alarm/Data Transmitter
Model	: VTX5900 with Patch Antenna
Test Configuration	: EUT/Signal Generator
Test Target	: FCC Class B
Mode of Operation	: Video/Audio input from Sig. Gen
	: Peak: L1(Green), L2(Blue)
	: 115 VAC, 60 Hz