



Engineering and Testing for EMC and Safety Compliance

CLASS II PERMISSIVE CHANGE REPORT

FCC PART 90

Backgrounds Unlimited, Incorporated
Old Town Hall, Rt. 11 South
P.O. Box 327
Mt. Sidney, VA 24467

MODEL: TXBD1W
FCC ID: NH5-FWTX1W

December 15, 2003

STANDARDS REFERENCED FOR THIS REPORT	
PART 2: 2001	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS
PART 15: 2001	RADIO FREQUENCY DEVICES - §15.109: RADIATED EMISSIONS LIMITS
PART 90: 2001	PRIVATE LAND MOBILE RADIO SERVICES
ANSI C63.4-1992	STANDARD FORMAT MEASUREMENT/TECHNICAL REPORT PERSONAL COMPUTER AND PERIPHERALS
ANSI/TIA/EIA603- 1992	LAND MOBILE FM OR PM COMMUNICATIONS EQUIPMENT MEASUREMENT AND PERFORMANCE STANDARDS
ANSI/TIA/EIA 603-1-1998	ADDENDUM TO ANSI/TIA/EIA 603-1992
ANSI/TIA/EIA -102.CAAA; 1999	DIGITAL C4FM/CQPSK TRANSCEIVER MEASUREMENT METHODS

Frequency Range	Output Power (W) Conducted	Frequency Tolerance (ppm)	Emission Designator
2463 MHz	1.0	26.834	16M5F3E

REPORT PREPARED BY TEST ENGINEER: DAN BALTZELL

Document Number: 2003215 / QRTL03-210

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1 GENERAL INFORMATION

The following Certification Report is prepared on behalf of Backgrounds Unlimited, Inc. in accordance with the Federal Communications Commission's Rules and Regulations. The Equipment Under Test (EUT) was Model # TXBD1W; FCC ID: NH5-FWTX1W. The test results reported in this document relate only to the item that was tested.

All measurements contained in this application were conducted in accordance with FCC Rules and Regulations CFR 47, Industry Canada RSS-210, and ANSI C63.4 Methods of Measurement of Radio Noise Emissions, 1992. The instrumentation utilized for the measurements conforms to the ANSI C63.4 standard for EMI and Field Strength Instrumentation. Calibration checks are performed regularly on the instruments, and all accessories including high pass filter, coaxial attenuator, preamplifier and cables.

1.1 TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data is located on the parking lot of Rhein Tech Laboratories, Inc. 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report dated March 3, 2000, submitted to and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4 1992).

1.2 RELATED SUBMITTAL(S)/GRANT(S)

This is a Class II Permissive Change application per FCC Part 2.1043(b)(2) for the addition of a 5.5 dBi gain "Rubber Duck" omni antenna. The FCC ID for the original certification is NH5-FWTX1W. No other changes to the equipment were made.

2 CONFORMANCE STATEMENT

STANDARDS REFERENCED FOR THIS REPORT	
PART 2: 1999	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS
PART 15: 1999	§15.109: RADIATED EMISSIONS LIMITS
PART 90: 2001	PRIVATE LAND MOBILE RADIO SERVICES
ANSI C63.4-1992	STANDARD FORMAT MEASUREMENT/TECHNICAL REPORT PERSONAL COMPUTER AND PERIPHERALS
ANSI/TIA/EIA603- 1992	LAND MOBILE FM OR PM COMMUNICATIONS EQUIPMENT MEASUREMENT AND PERFORMANCE STANDARDS
ANSI/TIA/EIA 603-1-1998	ADDENDUM TO ANSI/TIA/EIA 603-1992

Frequency Range	Output Power (W) Conducted	Frequency Tolerance (ppm)	Emission Designator
2463 MHz	1.0	26.834	16M5F3E

We, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this attached test record. No modifications were made to the equipment during testing in order to achieve compliance with these standards.

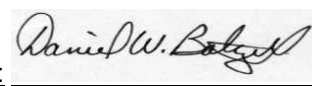
Furthermore, there was no deviation from, additions to, or exclusions from, the above standards for Certification methodology.

Signature: 

Date: December 15, 2003

Typed/Printed Name: Desmond Fraser

Position: President

Signature: 

Date: December 15, 2003

Typed/Printed Name: Daniel Baltzell

Position: Test Engineer



Accredited by the National Voluntary Accreditation Program for the specific scope of accreditation under Lab Code 200061-0.

Note: This report may not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

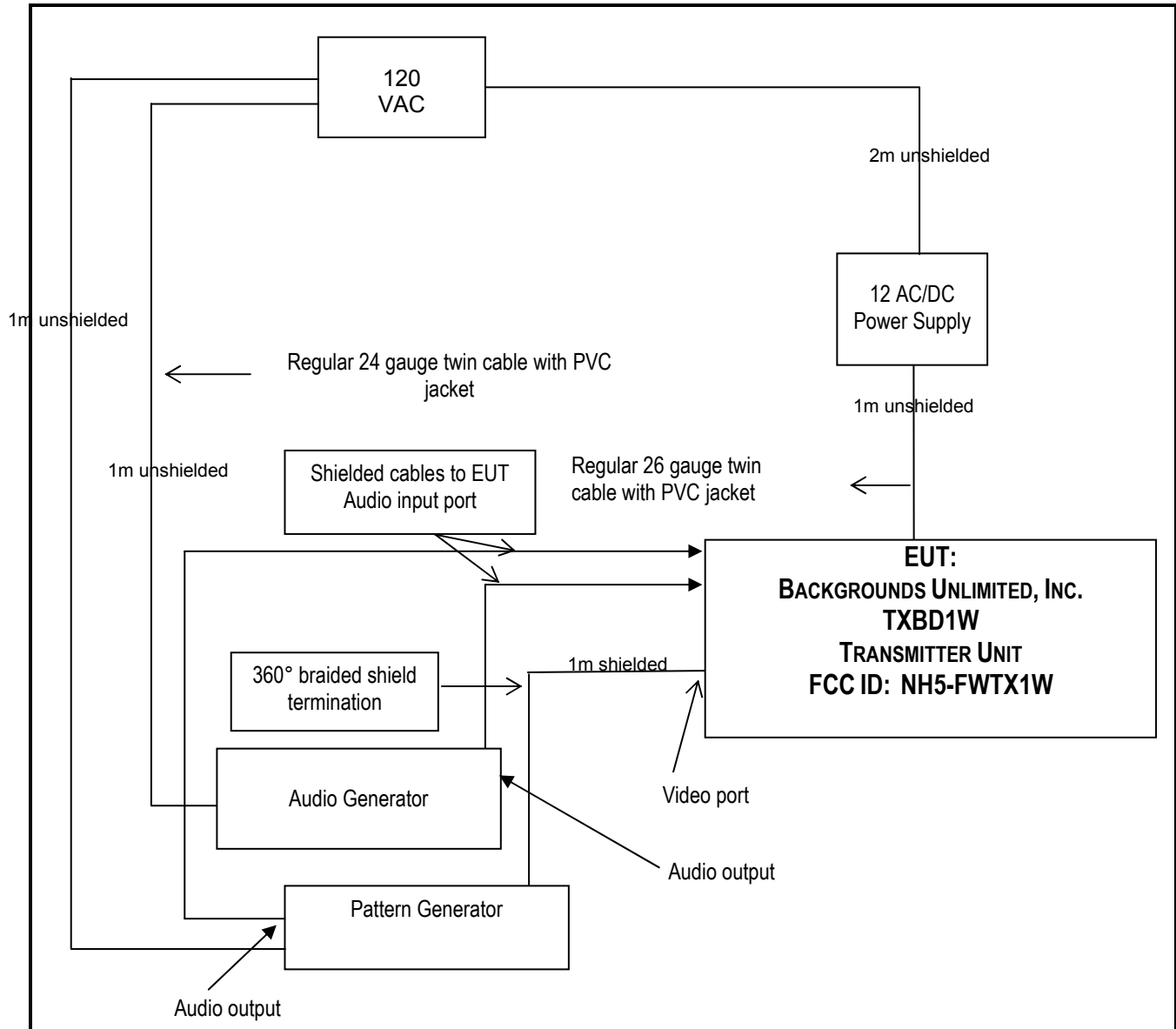
3 TESTED SYSTEM DETAILS

Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable.

TABLE 3-1: EQUIPMENT UNDER TEST (EUT)

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	FCC ID	CABLE DESCRIPTIONS	RTL BAR CODE
Transmitter Module (EUT)	Backgrounds Unlimited, Inc.	TXBD1W	34-042503003	NH5-FWTX1W	Unshielded Power	15179
Pattern Generator	Phillips	PM5418TDSI	NC: 9452 054 18763 NO: LO 662559	N/A	Shielded I/O	900369

FIGURE 3-1: CONFIGURATION OF TESTED SYSTEM



4 FCC RULES AND REGULATIONS PART 2 §2.1046 (A): RF POWER OUTPUT: CONDUCTED

4.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, section 2.2.1

The EUT was connected to a coaxial attenuator having a 50Ω load impedance.

4.2 TEST DATA

The carrier (in MHz) was tested: 2463

TABLE 4-1: RF POWER OUTPUT: CARRIER OUTPUT POWER (UNMODULATED)

Channel	Frequency (MHz)	RF Power Measured (Watt)*
1	2463	1.0

* Measurement accuracy: +/- .02 dB (logarithmic mode)

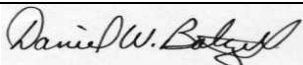
TABLE 4-2: RF POWER OUTPUT (RATED POWER)

Rated Power (W)
1.0

TABLE 4-3: TEST EQUIPMENT USED FOR TESTING (RF POWER OUTPUT - CONDUCTED)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901184/901186	Agilent	E4416A/E9323A	Power Meter / Sensor	GB41050573/US40410380	07/30/04

TEST PERSONNEL:

DANIEL W. BALTZELL		December 9, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

5 FCC RULES AND REGULATIONS PART 2 §2.1046 (A): RF POWER OUTPUT: RADIATED

5.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, section 2.2.1

The EUT was connected to the 5.5 dBi "rubber duck" omni antenna.

5.2 TEST DATA

The carrier (in MHz) was tested: 2463

TABLE 5-1: RF POWER OUTPUT: CARRIER OUTPUT POWER (UNMODULATED)

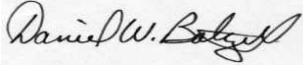
Channel	Frequency (MHz)	RF Power Measured (Watt)*
1	2463	1.3

* Measurement accuracy: +/- 0.5 dB

TABLE 5-2: TEST EQUIPMENT USED FOR TESTING (RF POWER OUTPUT - RADIATED)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900772	EMCO	3161-02	Horn Antenna 2 - 4 GHz	9804-1044	3/15/04
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
900928	Hewlett Packard	83752A	Synthesized Sweeper, 0.01 to 20 GHz	3610A00866	8/5/04
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	7/15/04
901231	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	1/30/04
901232	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	1/30/04
901235	IW Microwave Products	KPS-1503-360-KPS	High frequency RF cables	36"	1/30/04
901242	Rhein Tech Labs	WRT-000-0003	Wood rotating table	N/A	Not Required

TEST PERSONNEL:

DANIEL W. BALTZELL		December 10, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

6 FCC RULES AND REGULATIONS PART 2 §2.1053 (A): FIELD STRENGTH OF SPURIOUS RADIATION

6.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, section 2.2.12; the transmitter is terminated with a 50 Ω load. The spurious emissions levels were measured and the device under test was replaced by a substitution antenna connected to a signal generator. The signal generator level was then corrected by subtracting the cable loss between the substitution antenna and the signal generator. The gain of the antenna was further corrected to a half wave dipole.

TRANSMITTER INPUT MODULATION: The test signal modulating the main carrier consists of a standard NTSC video signal with two audio sub-carriers at 6.0 MHz and 6.5 MHz and 0.75 Vpp audio levels respectively. The NTSC video signal has a 1 Vpp maximum level and a maximum bandwidth of 4.25 MHz. The video processing circuit of the transmitter consists of a pre-emphasis network that conforms to the NTSC standard CCIR 405 525 line plot. The Transmitter is designed for pre-emphasis audio and video NTSC standard signals only. The content of the video signal in conjunction with the pre-emphasis network ensures that the occupied bandwidth will not exceed the limit as defined by the calculated necessary bandwidth and §90.210(b). The test signal used for measuring occupied bandwidth was a color bar (75% color bars from a video pattern generator) which contains high frequency content at amplitudes that far exceed that which would be received from an NTSC video camera. Under conditions of extreme brightness, a video camera is incapable of generating a signal that would cause the transmitter's occupied bandwidth to exceed that measured using the 75% color bar signal. Therefore, the 75% color bar signal represents a worse case modulation condition.

6.2 TEST DATA

6.2.1 CFR 47 PART 90.210 REQUIREMENTS

The worst-case emissions test data are shown. The magnitude of emissions attenuated more than 20 dB below the FCC limit need not be recorded.

TABLE 6-1: FIELD STRENGTH OF SPURIOUS HARMONIC - CARRIER AT 2463 MHZ

Radiated Spurious Emissions; Carrier 2463 MHz; Limit = $43 + 10 \log P = 43$ dBc; Conducted Power = 30 dBm = 1.0 W

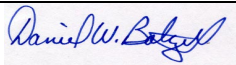
Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Corrected Signal Generator Level (dBc)	Limit (dBc)	Margin (dB)
4913.075	34.2	-53.0	7.9	7.7	83.2	43.0	-40.2
4919.280	46.0	-40.8	7.9	7.7	71.0	43.0	-28.0
4925.575	60.0	-26.8	7.8	7.7	56.9	43.0	-13.9
4931.820	46.0	-41.6	7.7	7.7	71.6	43.0	-28.6
4938.070	33.8	-53.7	7.7	7.7	83.7	43.0	-40.7
7376.000	34.5	-52.9	9.6	8.6	83.9	43.0	-40.9
7382.500	43.7	-43.6	9.7	8.6	74.7	43.0	-31.7
7388.399	54.5	-33.1	9.7	8.6	64.2	43.0	-21.2
7394.600	44.0	-43.4	9.8	8.6	74.6	43.0	-31.6
7400.750	34.7	-52.9	9.8	8.6	84.1	43.0	-41.1
9845.000	36.4	-44.3	10.8	8.8	76.3	43.0	-33.3
9851.441	40.9	-39.8	10.8	8.8	71.8	43.0	-28.8
9857.400	36.2	-44.3	10.8	8.8	76.3	43.0	-33.3
12301.610	35.4	-46.4	11.8	10.3	77.9	43.0	-34.9
12307.730	41.2	-40.9	11.7	10.3	72.3	43.0	-29.3
12314.230	46.2	-35.2	11.7	10.1	66.8	43.0	-23.8
12320.160	41.7	-39.6	11.7	10.1	71.2	43.0	-28.2
12327.030	35.5	-46.0	11.7	10.1	77.6	43.0	-34.6
14764.670	36.0	-32.2	12.6	9.8	65.0	43.0	-22.0
14771.010	39.5	-28.7	12.6	9.8	61.5	43.0	-18.5
14777.260	40.9	-27.3	12.6	9.8	60.1	43.0	-17.1
14783.510	39.0	-28.7	12.7	9.8	61.6	43.0	-18.6
14789.840	35.7	-32.0	12.9	9.8	65.1	43.0	-22.1

*This insertion loss corresponds to the cable connecting the RF Signal Generator to the $\frac{1}{2}$ wave dipole antenna.

TABLE 6-2: TEST EQUIPMENT USED FOR TESTING (FIELD STRENGTH OF SPURIOUS RADIATION)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900151	Rhode and Schwarz	HFH2-Z2	Loop Antenna (9 kHz - 30 MHz)	827525/019	8/25/06
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	3/15/04
900811	Rhein Tech Labs	PR-1040	Amplifier	1003	2/13/04
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
900928	Hewlett Packard	83752A	Synthesized Sweeper (0.01 - 20 GHz)	3610A00866	8/5/04
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	7/15/04
901053	Schaffner Chase	CBL6112B	Bi-Log Antenna (20 MHz - 2 GHz)	2648	7/03/04
901231	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	1/30/04
901232	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	1/30/04
901235	IW Microwave Products	KPS-1503-360-KPS	High frequency RF cables	36"	1/30/04
901242	Rhein Tech Labs	WRT-000-0003	Wood rotating table	N/A	Not Required
900321	EMCO	3161-03	Horn Antennas (4 - 8,2GHz)	9508-1020	4/10/04
900323	EMCO	3160-7	Horn Antennas (8,2 - 12,4 GHz)	9605-1054	6/10/04
900325	EMCO	3160-9	Horn Antennas (18 - 26.5 GHz)	9605-1051	3/15/04
900772	EMCO	3161-02	Horn Antenna	9804-1044	3/15/04
900932	Hewlett Packard	8449B OPT H02	Preamplifier 1-26.5 GHz	3008A00505	4/22/04

TEST PERSONNEL:

DAN BALTZELL		December 10, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

7 RADIATED EMISSION FOR DIGITAL EMISSIONS - §15.209

7.1 RADIATED EMISSION TEST PROCEDURE FOR DIGITAL EMISSIONS

Radiated spurious emissions for digital interface are subject to the limits of FCC §15.109, except for the emissions contained in the restricted frequency bands in FCC §15.205.

7.2 RADIATED EMISSION TEST DATA - DIGITAL INTERFACE

TABLE 7-1: RADIATED EMISSIONS

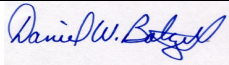
Temperature: 30°F					Humidity: 46%				
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
504.180	Qp	H	0	1.5	32.7	-20.1	12.6	46.0	-33.4
504.192	Qp	H	0	1.5	33.3	-20.1	13.2	46.0	-32.8
504.432	Qp	H	0	1.5	33.3	-20.0	13.3	46.0	-32.7
507.434	Qp	H	0	1.5	46.5	-20.0	26.5	46.0	-19.5
510.442	Qp	H	0	1.5	31.5	-19.8	11.7	46.0	-34.3
510.707	Qp	V	0	1.5	30.7	-20.2	10.5	46.0	-35.5
1497.507	Av	V	0	1.5	31.9	-4.8	27.1	54.0	-26.9
1738.827	Av	H	0	1.5	30.2	-1.1	29.1	54.0	-24.9

QP: RES. =100 kHz, VID= 100 kHz

TABLE 7-2: TEST EQUIPMENT USED FOR TESTING (DIGITAL EMISSIONS RADIATION)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900811	Rhein Tech Labs	PR-1040	Amplifier	1003	2/13/04
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	7/15/04
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901235	IW Microwave Products	KPS-1503-360-KPS	High frequency RF cables	36"	1/30/04
901242	Rhein Tech Labs	WRT-000-0003	Wood rotating table	N/A	Not Required

TEST PERSONNEL:

DAN BALTZELL		December 10, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

8 CONCLUSION

The data in this measurement report shows that the Backgrounds Unlimited, Inc., Model # TXBD1W, FCC ID: NH5-FWTX1W, complies with all the applicable requirements of Parts 90, 15 and 2 of the FCC Rules and Regulations.