



Engineering and Testing for EMC and Safety Compliance

## TYPE CERTIFICATION 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-FWVTX1W**

*May 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
RSS-119; Issue 6; 2000	LAND MOBILE AND FIXED RADIO TRANSMITTERS AND RECEIVERS 27.41 TO 960.0 MHz

Frequency Range	Output Power (W) Conducted	Frequency Tolerance (ppm)	Emission Designator
2463 MHz	1.0	26.77	16M5F3E

REPORT PREPARED BY TEST ENGINEER: DAN BALTZELL

*Document Number: 2003073 / QRTL03-776*

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## **1 GENERAL INFORMATION**

The following Type Certification Report is prepared on behalf of Backgrounds Unlimited, Inc. in accordance with the Federal Communications Commission and Industry Canada 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 an original application report.

## 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
ANSI/TIA/EIA -102.CAAA; 1999	DIGITAL C4FM/CQPSK TRANSCEIVER MEASUREMENT METHODS
RSS-119; Issue 6; 2000	LAND MOBILE AND FIXED RADIO TRANSMITTERS AND RECEIVERS 27.41 TO 960.0 MHz

Frequency Range	Output Power (W) Conducted	Frequency Tolerance (ppm)	Emission Designator
2463 MHz	1.0	26.77	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: May 15, 2003

Typed/Printed Name: Desmond Fraser

Position: President

Signature: 

Date: May 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.

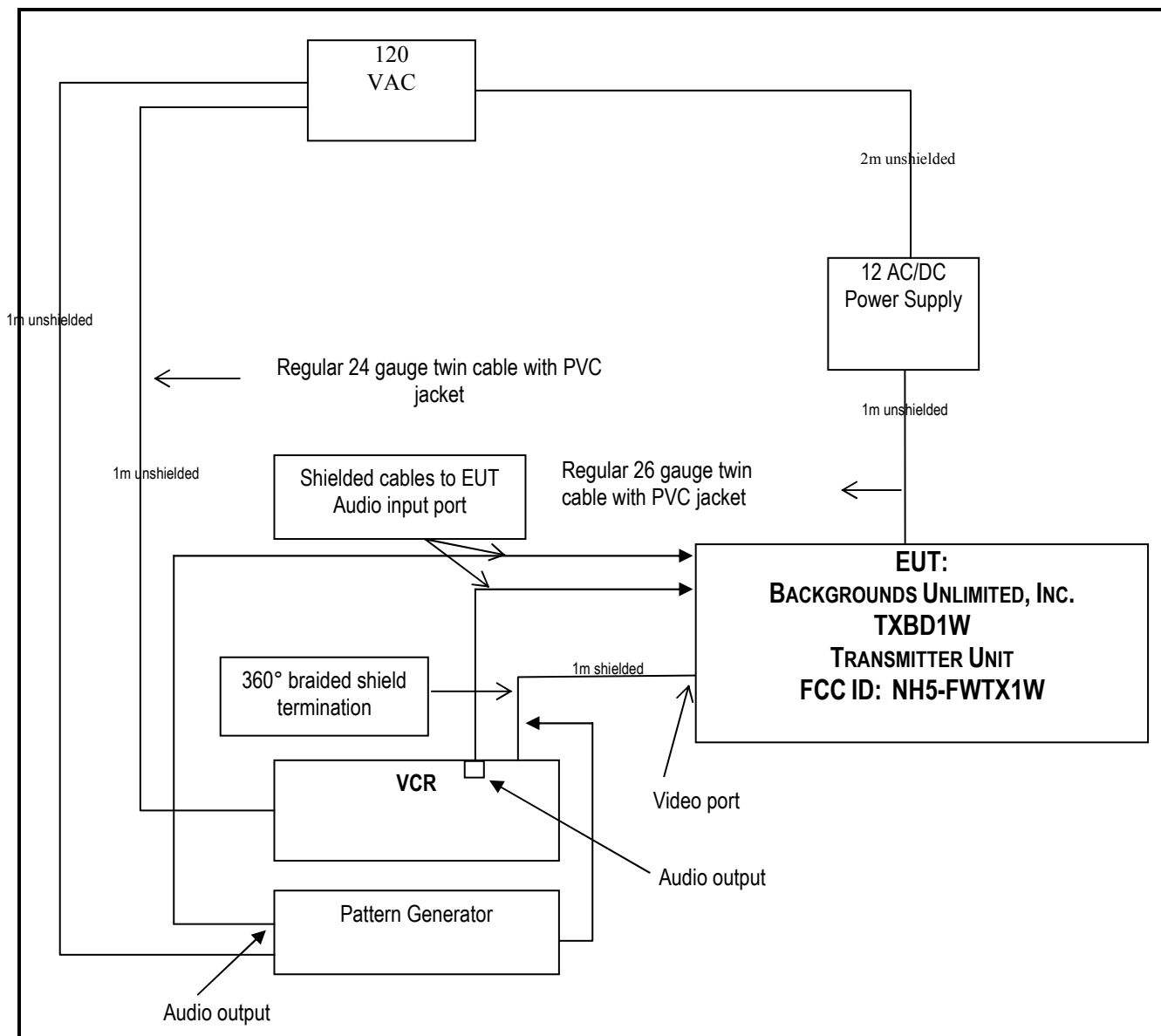
### 3 TESTED SYSTEM DETAILS

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
Television	Sony Corp.	PVM-1354Q	2019597	N/A	Shielded I/O, Unshielded Power	900470
Receiver	RF-Link Technology, Inc.	Wavecom FR101J	7B052J	N/A	Shielded I/O, Unshielded Power, Shielded Coaxial Cable	7140
Receiving Antenna (Camera)	Backgrounds Unlimited, Incorporated.	FWV-01A	12A6	NH5FWVTXBD01A	N/A	7138
VCR	JVC	HR-S5100U	15920318	ASIP5D024	Shielded I/O, Unshielded Power	900161
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
900770	Hewlett Packard	437B	Power Meter	2949A02966	02/19/04
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	06/14/03
900937	Hewlett Packard	8482H	Power Sensor	3318A08961	02/01/04
901184/901186	Agilent	E4416A/E9323A	Power Meter / Sensor	GB41050573/US40410380	07/19/03

##### TEST PERSONNEL:

DESMOND FRASER		MAY 12, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

## 5 FCC RULES AND REGULATIONS PART 2 §2.1051: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

### 5.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, Section 2.2.13: The transmitter is terminated with a 50  $\Omega$  load and interfaced with a spectrum analyzer.

**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.

### 5.2 TEST DATA

Frequency range of measurement per Part 2.1057: 9 kHz to 10 x Fc

Limits: Mask B (dBm):  $P(\text{dBm}) - (43 + 10 \times \text{LOG } P(\text{W}))$

The carrier was investigated at 2463 MHz. The worse case (unwanted emissions) data are shown below. The magnitude of emissions attenuated more than 20 dB below the FCC limit need not be recorded.

**TABLE 5-1: CONDUCTED SPURIOUS EMISSIONS CARRIER – 2463 MHz**

(2463 MHz); 99% BW = 9.4 MHz; Conducted power = 1 W

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin(dB)
502.9	65.6	43	-22.6
4930.0	53.0	43	-10.0
7390.0	52.5	43	-10.5
9850.0	47.6	43	-4.6

**TABLE 5-2: TEST EQUIPMENT USED FOR TESTING (CONDUCTED SPURIOUS EMISSIONS)**

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901215	Hewlett Packard	8564EM	EMC Analyzer	3826A00144	08/23/03
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585	07/31/03
901054	Hewlett Packard	HP 3586B	Selective Level Meter	1928A01892	08/31/03
900913	Hewlett Packard	85462A	EMI Receiver RF Section	3325A00159	12/05/03

TEST PERSONNEL:

DESMOND FRASER		MAY 12, 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  $\Omega$  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)
4918.793	34.5	-51.5	5.3	7.0	79.8	43.0	-36.8
4925.472	55.2	-31.0	5.3	7.0	59.3	43.0	-16.3
4931.904	30.5	-55.5	5.3	7.0	83.8	43.0	-40.8
7381.543	36.0	-34.2	6.4	7.6	63.0	43.0	-20.0
7388.195	51.3	-17.0	6.4	7.6	45.8	43.0	-2.8
7394.550	36.3	-33.4	6.4	7.6	62.2	43.0	-19.2
9844.361	33.0	-46.8	7.3	8.6	75.6	43.0	-32.6
9850.416	47.7	-31.8	7.3	8.6	60.6	43.0	-17.6
9857.056	33.2	-46.6	7.3	8.6	75.4	43.0	-32.4
12306.702	26.8	-48.0	8.5	8.3	78.2	43.0	-35.2
12313.306	37.7	-37.3	8.5	8.3	67.5	43.0	-24.5
12319.662	27.3	-48.2	8.5	8.4	78.4	43.0	-35.4
14769.115	26.7	-41.5	9.1	9.0	71.6	43.0	-28.6
14775.768	30.0	-38.3	9.1	9.0	68.5	43.0	-25.5
14782.233	26.5	-41.2	9.1	8.9	71.3	43.0	-28.3
17238.411	26.3	-42.4	9.7	9.9	72.2	43.0	-29.2

\*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
901053	Schaffner-Chase	CBL6112	Antenna (25 MHz – 2 GHz)	2648	06/11/03
900932	Hewlett Packard	8449B OPT H02	Preamplifier (1 - 26.5 GHz)	3008A00505	N/A
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	07/02/03
900917	Hewlett Packard	8648C	Synthesized Signal Generator (9 kHz - 3200 MHz)	3537A01741	04/19/04
900928	Hewlett Packard	83752A	Synthesized Sweeper (0.01 - 20 GHz)	3610A00866	06/19/03

TEST PERSONNEL:

DAN BALTZELL		MAY 17, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

## 7 FCC RULES AND REGULATIONS PART 2 §2.1049 (C) (1): OCCUPIED BANDWIDTH

OCCUPIED BANDWIDTH - COMPLIANCE WITH THE EMISSION MASKS

### 7.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, section 2.2.11 and TIA/EIA-102.CAAA-1999 section 2.2.5

Device with audio modulation: Transmitter was modulated with a 2,500 Hz sine wave at an input level of 16 dB greater than that required to produce 50% of rated system deviation at 1,000 Hz.

**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.

## 7.2 EMISSION MASK B CALCULATION

Rated power output: 1.0 watt

Authorized bandwidth: 13.1 MHz (measured at -26 dBc, unmodulated)

### FCC Part 90.210 (b) 1

On any frequency removed from the assigned frequency by more than 50%, but not more than 100% or the authorized bandwidth:  
 At least 25dB

### FCC Part 90.210 (b) 2

On any frequency removed from the assigned frequency by more than 100%, but not more than 250% or the authorized bandwidth:  
 At least 35dB

### FCC Part 90.210 (c) 3

On any frequency removed from the assigned frequency by more than 250% of the authorized bandwidth:  
 At least  $43 + 10 \log(p)$  dB

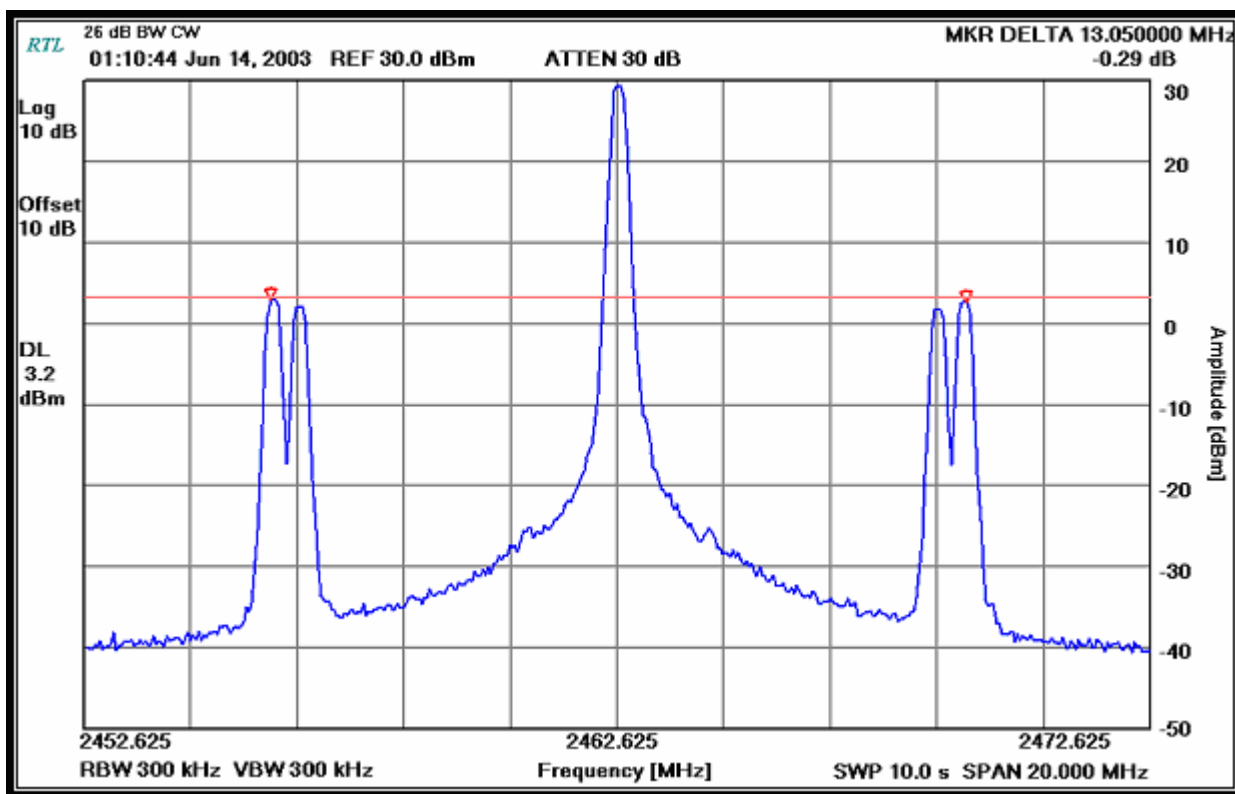
50% of the authorized BW =  $0.5 \times 13.1 \text{ MHz} = 6.6 \text{ MHz}$

100% of the authorized BW =  $1 \times 13.1 \text{ MHz} = 13.1 \text{ MHz}$

250% of the authorized BW =  $2.5 \times 13.1 \text{ MHz} = 32.8 \text{ MHz}$

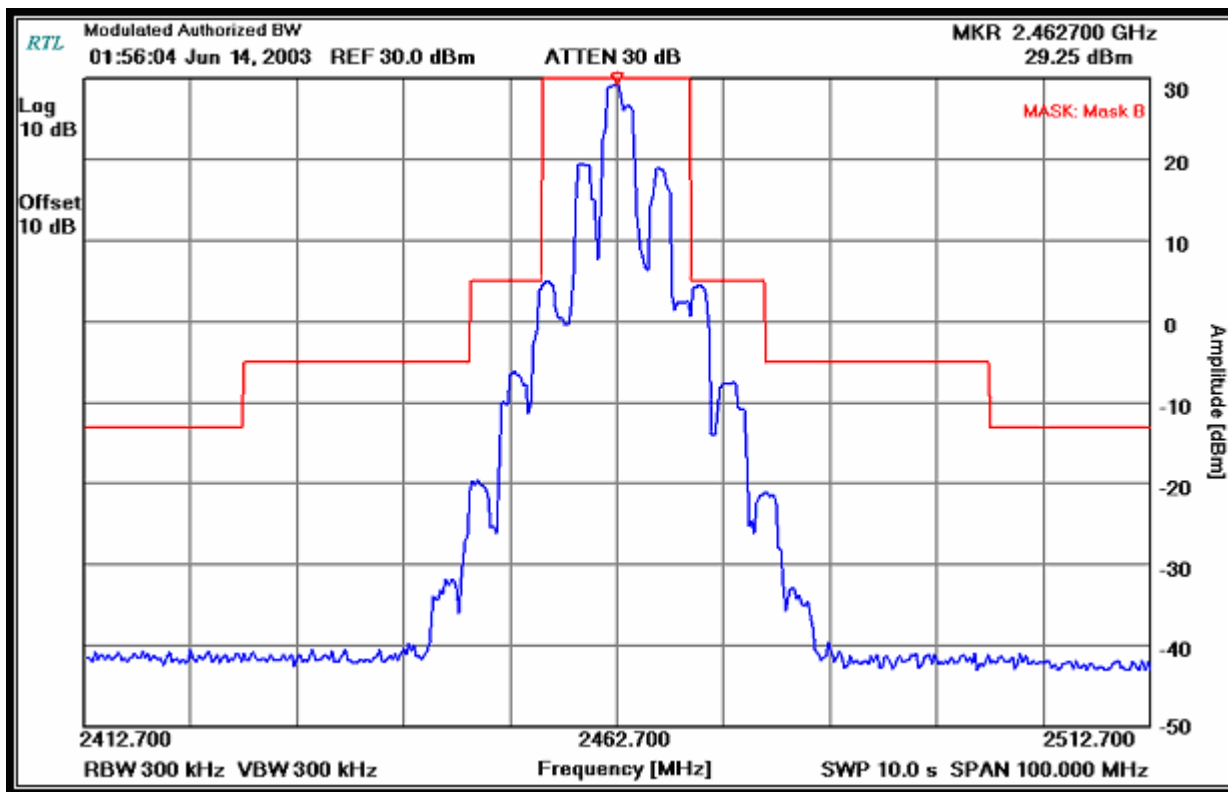
Frequency band	Required attenuation
Fc -6.6 MHz to Fc +6.6 MHz	0 dB
Fc -13.1 MHz to Fc +13.1 MHz	25 dB
Fc -32.8 MHz to Fc +32.8 MHz	35 dB
More than 250% $43 + 10 \log(P)$ dB	43 dB

### 7.3 TEST DATA



PLOT 7-1: OCCUPIED BANDWIDTH; CW






PLOT 7-2: OCCUPIED BANDWIDTH; AUDIO AND VIDEO MODULATION-PRE-EMPHASIS NTSC

#### 7.4 TEST EQUIPMENT USED FOR TESTING

TABLE 7-1: TEST EQUIPMENT USED FOR TESTING (OCCUPIED BANDWIDTH)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901215	Hewlett Packard	8596EM (9 kHz - 12.8 GHz)	EMC Analyzer	3826A00144	08/23/03
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	06/14/03

#### TEST PERSONNEL:

DAN BALTZELL		JUNE 14, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

## 8 FCC RULES AND REGULATIONS PART 2 §2.202: NECESSARY BANDWIDTH AND EMISSION BANDWIDTH

The modulating signal consists of a video carrier and two audio sub-carriers. The mean radiated power from each of the sub-carriers is less than 0.5 percent of the total mean radiated power, therefore, only the characteristics video component of the modulating signal are considered when calculating the necessary bandwidth.

Type of Emission: F3E

Necessary Bandwidth and Emission Bandwidth:

Modulation: 1Vpp CCIR 405 NTSC Pre-emphasis audio and Video.

### Calculation:

Max modulation (M) in MHz: 4.25MHz for CCIR 405 525 lines NTSC Video

Max deviation (D) in MHz: 4

Constant factor (K): 1 (assumed)

$B_n = 2 \times M + 2 \times DK = 16.5 \text{ MHz}$

Emission designator: 16M5F3E

Measurement: 99.75% Occupied Bandwidth

$B_n = 13.1 \text{ MHz}$

Emission designator: 13M1F3E

**TABLE 8-1: TEST EQUIPMENT USED FOR NECESSARY AND EMISSION BANDWIDTH MEASUREMENTS**

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900913	Hewlett Packard	8546	EMI Receiver	3325A00159	12/05/03
900914	Hewlett Packard	85460	RF Filter Section	3330A00107	12/05/03

### TEST PERSONNEL:

DAN BALTZELL		MAY 17, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

## 9 FCC RULES AND REGULATION PART 2 §2.1055: FREQUENCY STABILITY

### 9.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, section 2.2.2

The carrier frequency stability is the ability of the transmitter to maintain an assigned carrier frequency.

The EUT was evaluated over the temperature range -30°C to +60°C.

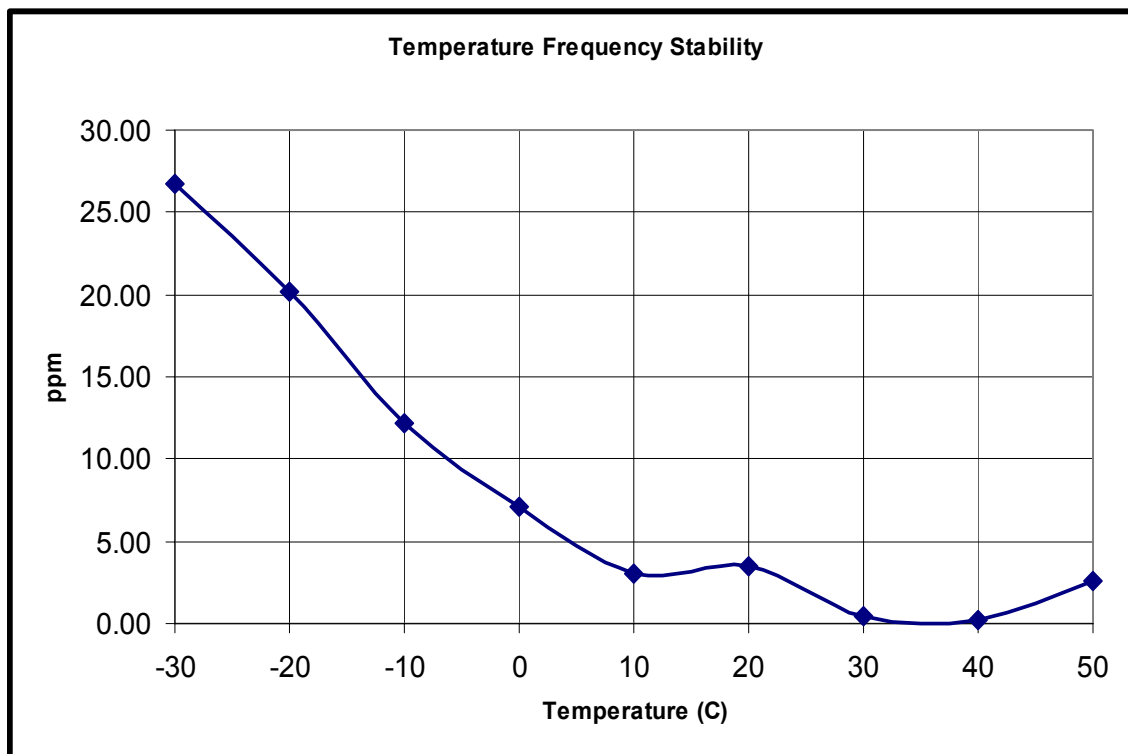
The temperature was initially set to -30°C and a 2-hour period was observed for stabilization of the EUT. The frequency stability was measured within one minute after application of primary power to the transmitter. The temperature was raised at intervals of 10 degrees centigrade through the range. A half hour period was observed to stabilize the EUT at each measurement step and the frequency stability was measured within one minute after application of primary power to the transmitter. Additionally, the power supply voltage of the EUT was varied from the battery end point to maximum voltage.

The worst-case test data are shown in Table 11-1.

### 9.2 TEST DATA

#### 9.2.1 FREQUENCY STABILITY/TEMPERATURE VARIATION

Worst-case deviation was found to be 26.77 ppm at -30°C.



PLOT 9-1: TEMPERATURE FREQUENCY STABILITY


**TABLE 9-1: TEMPERATURE FREQUENCY STABILITY CARRIER AT 2463 MHz**

Temperature C	Measured Frequency (MHz)	ppm
-30°C	2463.06594	26.77
-20°C	2463.0498	20.22
-10°C	2463.02988	12.13
0°C	2463.01743	7.08
10°C	2463.00747	3.03
20°C (Ref)	2463.00866	3.52
30°C	2463.00119	0.49
40°C	2463.0005	0.20
50°C	2463.00628	2.55

**TABLE 9-2: TEST EQUIPMENT USED FOR TESTING (FREQUENCY STABILITY/TEMPERATURE)**

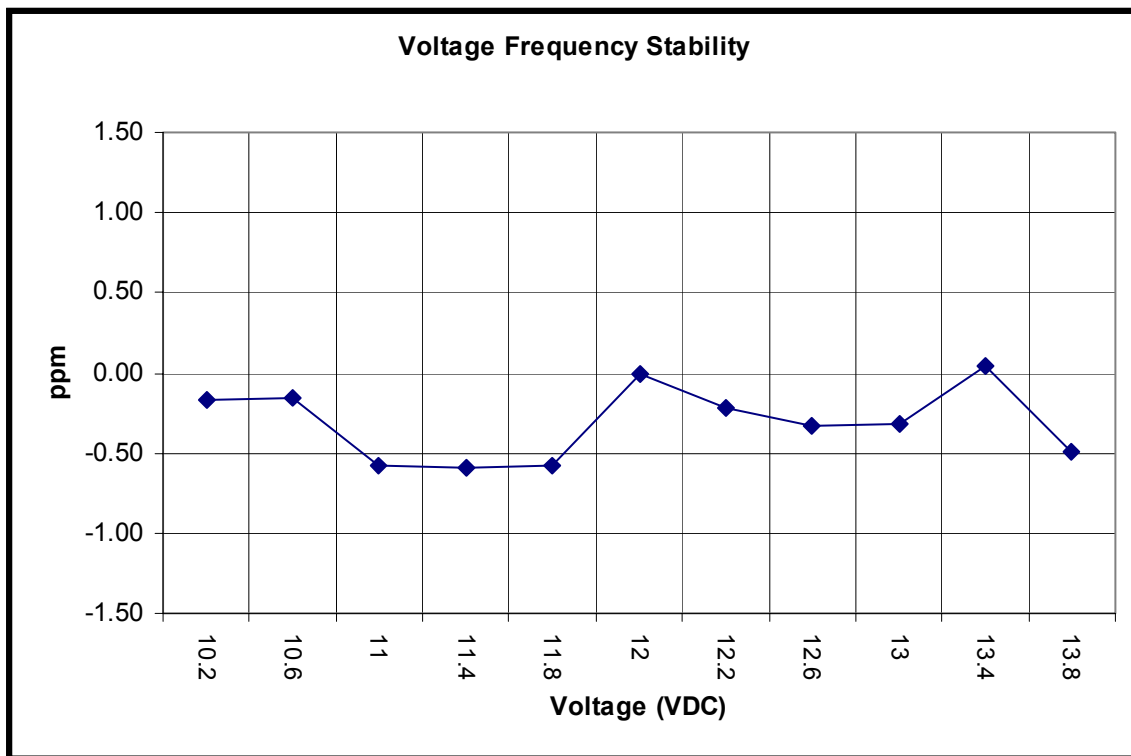
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900946	Tenney Engineering, Inc.	TH65	Temperature Chamber with Humidity	11380	12/16/03
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	06/14/03

**TEST PERSONNEL:**

DAN BALTZELL		MAY 17, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

## 9.2.2 FREQUENCY STABILITY/VOLTAGE VARIATION

Worst-case variation is -0.06 ppm at the 8.625 VDC.



PLOT 9-2: VOLTAGE FREQUENCY STABILITY


TABLE 9-3: FREQUENCY STABILITY/VOLTAGE VARIATION CARRIER AT 2463 MHZ

Voltage (Vdc)	Measured Frequency (MHz)	ppm
10.2	2462.599169	-0.2
10.6	2462.599266	-0.2
11.0	2462.598226	-0.6
11.4	2462.598201	-0.6
11.8	2462.598213	-0.6
12.0 (Ref)	2462.599651	0.0
12.2	2462.599126	-0.2
12.6	2462.598826	-0.3
13.0	2462.598996	-0.3
13.4	2462.598999	0.1
13.8	2462.598451	-0.5

**TABLE 9-4: TEST EQUIPMENT USED FOR TESTING (FREQUENCY STABILITY/VOLTAGE)**

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901215	Hewlett Packard	8596EM (9 kHz - 12.8 GHz)	EMC Analyzer	3826A00144	08/23/03
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	06/14/03

TEST PERSONNEL:

DAN BALTZELL		MAY 17, 2003
TEST TECHNICIAN/ENGINEER	SIGNATURE	DATE OF TEST

## **10 FCC PART 2 §2.1047 (A): MODULATION CHARACTERISTICS - AUDIO FREQUENCY RESPONSE**

### **10.1 TEST PROCEDURE**

ANSI/TIA/EIA-603-1992, section 2.2.6

The audio frequency response is the degree of closeness to which the frequency deviation of the transmitter follows a prescribed characteristic.

The input audio level at 1000 Hz was set to produce 20% of the rated system deviation. This point is shown as the 0 dB reference level, noted DEVref. The audio signal generator was varied from 100 Hz to 5 kHz with the input level held constant. The deviation in kHz was recorded using a modulation analyzer as DEVfreq. The response in dB relative to 1 kHz was calculated as follows:

Audio Frequency Response = 20 LOG (DEVfreq/DEVref)

### **10.2 TEST DATA**

Not applicable; the EUT does not contain an audio low pass filter. The EUT is designed to use pre-emphasis NTSC audio.

## **11 FCC PART 2 §2.1047 (A): MODULATION CHARACTERISTICS – AUDIO LOW PASS FILTER**

### **11.1 TEST PROCEDURE**

ANSI/TIA/EIA-603-1992, 2.2.15

The Audio Low Pass Filter Response is the frequency response of the post limiter low pass filter circuit above 3000 Hz.

### **11.2 TEST DATA**

Not applicable; the EUT does not contain an audio low pass filter. The EUT is designed to use pre-emphasis NTSC audio.

## **12 FCC RULES AND REGULATIONS PART 2 §2.1047 (B): MODULATION CHARACTERISTICS - MODULATION LIMITING**

### **12.1 TEST PROCEDURE**

ANSI/TIA/EIA-603-1992, section 2.2.3

The transmitter was adjusted for full rated system deviation. The audio input level was adjusted for 60% of rated system deviation at 1000 Hz. Using this level as a reference (0dB) the audio input level was varied from the reference +/-20 dB for modulation frequencies of 300 Hz, 1,000 Hz, and 2,500 Hz. The system deviation obtained as a function of the input level was recorded. Both positive and negative peak deviations were recorded.

### **12.2 TEST DATA**

Not applicable; the EUT does not contain modulation limiting circuitry. The EUT is designed to use pre-emphasis NTSC Video.

### **13 FCC RULES AND REGULATIONS PART 90 §90.214: TRANSIENT FREQUENCY BEHAVIOR**

#### **13.1 TEST PROCEDURE**

ANSI/TIA/EIA-603-1992, section 2.2.3

#### **13.2 TEST DATA**

Not applicable; the EUT does not contain modulation limiting circuitry or a low pass filter. The EUT is designed to use pre-emphasis NTSC audio and video.

### **14 CONCLUSION**

The data in this measurement report shows that the Backgrounds Unlimited, Inc., Model # TXBD1W, FCC ID: NH5-FWTX1W, complies with all the requirements of Parts 90, 15 and 2 of the FCC Rules, and Industry Canada RSS-210, Issue 6, 2000.