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APPLICANT: TOYTRONIX LLC

FCC ID: PGQ72FM-08T

TEST REPORT:

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EXHIBIT CONTAINING:

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GENERAL INFORMATION

2.1033(c)(1)(2) TOYTRONIX LLC will sell the  
FCCID: PGQ72FM-08T Radio Control  
transmitter in quantity, for use  
under FCC RULES PART 95 SUBPART C.

TOYTRONIX LLC  
3370 N. HAYDEN ROAD # 123.296  
SCOTTSDALE, AZ. 85251-6632

2.1033(c)(3) Instruction manual is included as exhibit #6.

2.1033 (4) Type of Emission: 6K4F1D  
95.631(b)(1)

Bn = 2M + 2DK  
M = 4,800 Bits per second  
D = 800 Hz (Peak Deviation)  
K = 1  
 $Bn = 2(4800/2) + 2(800) = 4.8K + 1.6K = 6.4k$   
ALLOWED AUTHORIZED BANDWIDTH = 8 kHz

95.633(b) Authorized Bandwidth 8KHz for RC Transmitter

2.1033(c)(5) Frequency Range: 72-73 MHz  
95.623(a)

95.649 (6) Power Range and Controls: There are NO user Power  
controls.

(6) Function of each electron tube or semiconductor  
device or other active circuit device:  
See Exhibit # 7.

95.639(b)(3)

7) Maximum Output Power: 32 milli Watts ERP.

(8) DC Voltages and Current into Final Amplifier:

FINAL AMPLIFIER ONLY

Vce = 12.0 Volts DC  
Ice = 0.039A.  
Pin = 0.5 Watts

2.1033(c)(9) Tune-up procedure. The tune-up procedure is included as  
Exhibit # 8.

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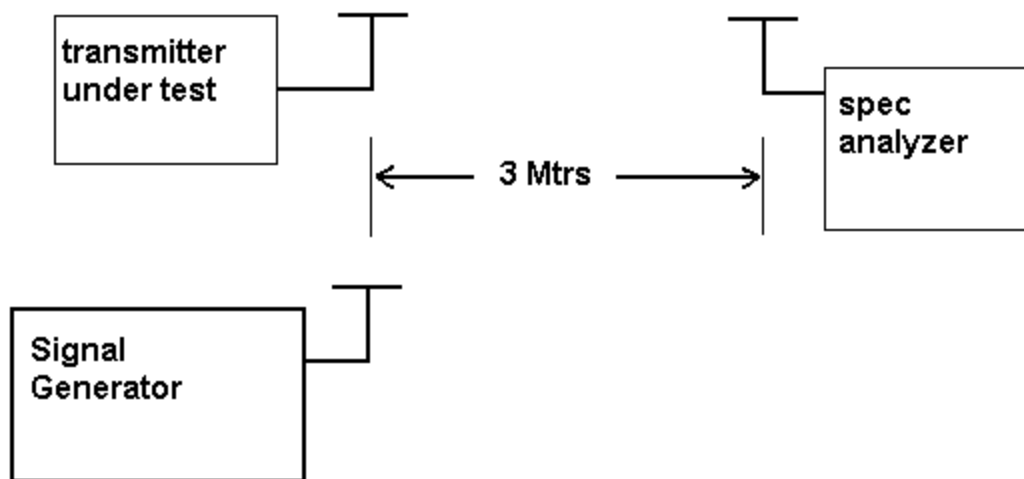
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- 2.1033(c)(10) Complete Circuit Diagrams: The circuit diagram is included as part of Exhibit # 5. The block diagrams are included as Exhibit #4 of this report.
- (10) Description of all circuitry and devices provided for determining and stabilizing frequency is given in Exhibit 7 of this report.
- 2.1033(c)(11) The Equipment identification is shown as Exhibit # 1.
- 2.1033(c)(12) Photographs of the equipment are shown as Exhibits 2-3.
- 2.1033(c)(13) Equipment employing Digital modulation. N/A.
- 2.1033(c)(14) The data required by 2.1046-2.1057 follows;
- 2.1046 RF power is measured by the ERP SUBSTITUTION METHOD. There is no provisions to vary the power. With a nominal battery voltage of 12.0 VDC, and the transmitter properly adjusted the RF output measures:

$$P_o = 0.032 \text{ W}$$

2.1046 RF power output.



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2.1047                    Modulation characteristics:

AUDIO FREQUENCY RESPONSE

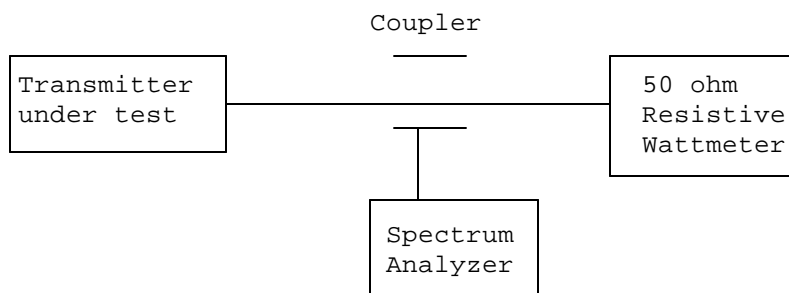
The Voice is NOT allowed in this band.

2.1049                    Occupied bandwidth:  
95.635(b)

- (1) At least 25dB on any frequency removed from the center of the authorized bandwidth by more that 50% up to and including 100% of the authorized bandwidth.
- (10) At least 45dB on any frequency removed from the center of the authorized bandwidth by more that 100% up to and including 125% of the authorized bandwidth.
- (11) At least 55dB on any frequency removed from the center of the authorized bandwidth by more that 125% up to and including 250% of the authorized bandwidth.
- (12) At least  $56 + \log_{10}(T)$  on any frequency removed from the center of the authorized bandwidth by more that 250%.

Test procedure diagram

OCCUPIED BANDWIDTH MEASUREMENT

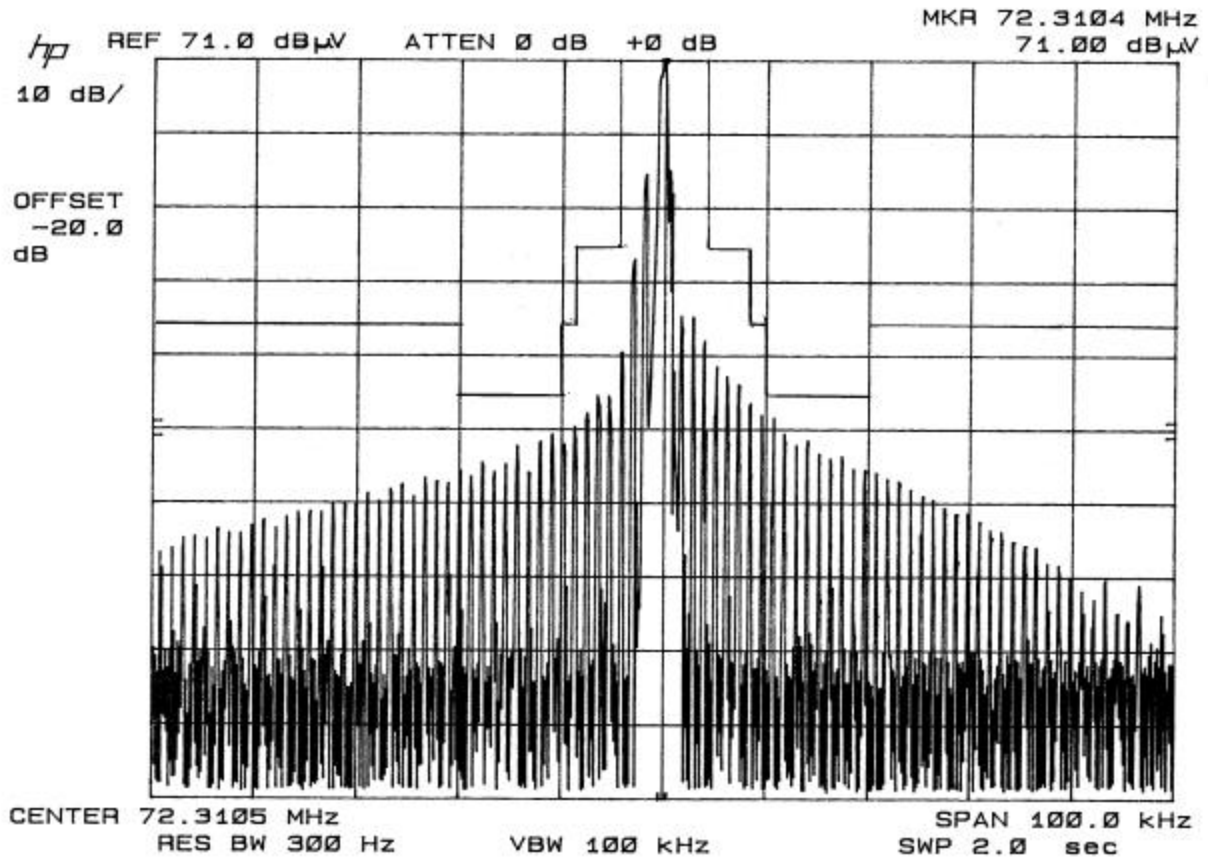


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OCCUPIED BANDWIDTH PLOT



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2.1051 SPURIOUS EMISSIONS AT ANTENNA TERMINALS.  
NOT APPLICABLE, NO antenna port. This UUT has a permanently attached antenna.

2.1053 UNWANTED RADIATION:  
95.635(1)(3)(7)(10)(11)(12)

REQUIREMENTS:

At least  $56 + 10\log(T)$  on any frequency removed from the center of the authorized bandwidth by more than 250%.

$$56 + 10\log(0.032) = 41.05\text{dB}$$

TEST DATA:

| Emission<br>Frequency<br>MHz | ATTN<br>dBc | dBm  | Margin<br>dB |
|------------------------------|-------------|------|--------------|
| 72.34                        | 0.0         | 15.1 | 0.00         |
| 144.68                       | 62          | -47  | 20.95        |
| 216.96                       | 70          | -55  | 28.95        |
| 289.36                       | 62          | -47  | 20.95        |
| 361.66                       | 69          | -54  | 27.95        |
| 433.96                       | 65          | -50  | 23.95        |
| 506.26                       | 61          | -46  | 19.95        |
| 578.58                       | 64          | -49  | 22.95        |
| 650.86                       | 59          | -44  | 17.95        |
| 723.20                       | 65          | -50  | 23.95        |

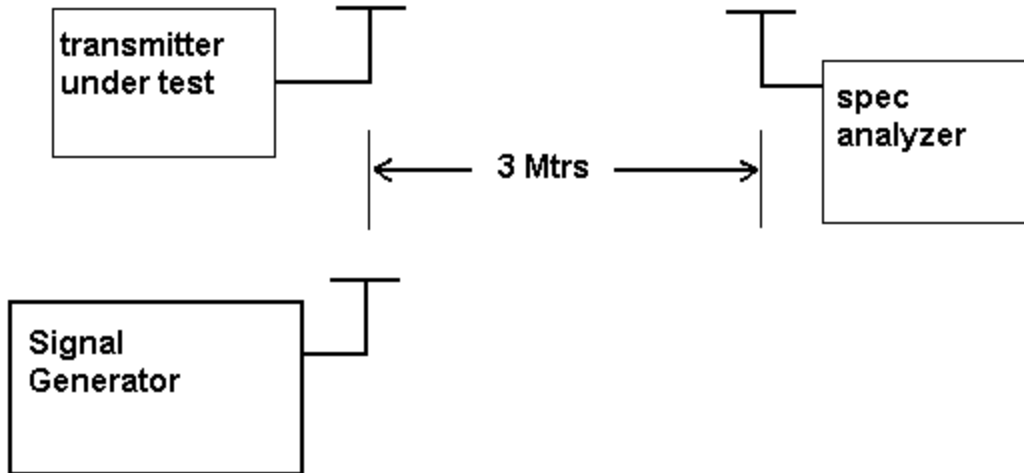
METHOD OF MEASUREMENT: The tabulated data shows the results of the radiated field strength emissions test. The spectrum was scanned from 30 MHz to at least the tenth harmonic of the fundamental. This test was conducted per TIA/EIA STANDARD 603 using the substitution method. Measurements were made at the open field test site of TIMCO ENGINEERING, INC. located at 849 NW State Road 45, Newberry, FL 32669

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# Method of Measuring Radiated Spurious Emissions



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2.1055(a)(1) Frequency stability:  
95.623(b)

Temperature and voltage tests were performed to verify that the frequency remains within the .002%, 20 ppm specification limit. The test was conducted as follows: The transmitter was placed in the temperature chamber at 25 degrees C and allowed to stabilize for one hour. The transmitter was keyed ON for one minute during which four frequency readings were recorded at 15 second intervals. The worse case number was taken for temperature plotting. The assigned channel frequency was considered to be the reference frequency. The temperature was then reduced to -30 degrees C after which the transmitter was again allowed to stabilize for one Hour. The transmitter was keyed ON for one minute, and again frequency readings were noted at 15 second intervals. The worst case number was recorded for temperature plotting. This procedure was repeated in 10 degree increments up to + 50 degrees C.

Readings were also taken at end point of the battery voltage of 12.0VDC.

MEASUREMENT DATA:

Assigned Frequency (Ref. Frequency): 72.309 186

| <u>TEMPERATURE °C</u> | <u>FREQUENCY MHz</u> | <u>PPM</u> |
|-----------------------|----------------------|------------|
| REFERENCE_____        | 72.309 186           | 0.00       |
| -30_____              | 72.310 252           | 14.74      |
| -20_____              | 72.310 325           | 15.75      |
| -10_____              | 72.310 336           | 15.90      |
| 0_____                | 72.310 181           | 13.76      |
| +10_____              | 72.309 902           | 9.90       |
| +20_____              | 72.309 542           | 4.92       |
| +30_____              | 72.309 16            | -0.36      |
| +40_____              | 72.308 747           | -6.07      |
| +50_____              | 72.308 388           | -11.04     |

BATT.End-Point 12.0V/dc 72.309 212 0.36

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## EMC Equipment List

|   | DEVICE  | MFGR             | MODEL         | SERNO                    | CAL/CHAR DATE   | DUE DATE or STATUS |
|---|---|------------------|---------------|--------------------------|-----------------|--------------------|
| X | 3-Meter OATS                                  | TEI              | N/A           | N/A                      | Listed 12/22/99 | 12/22/02           |
|   | 3/10-Meter OATS                               | TEI              | N/A           | N/A                      | Listed 3/26/01  | 3/26/04            |
|   | Receiver, Beige Tower Spectrum Analyzer (Tan) | HP               | 8566B Opt 462 | 3138A07786<br>3144A20661 | CAL 8/31/01     | 8/31/03            |
|   | RF Preselector (Tan)                          | HP               | 85685A        | 3221A01400               | CAL 8/31/01     | 8/31/03            |
|   | Quasi-Peak Adapter (Tan)                      | HP               | 85650A        | 3303A01690               | CAL 8/31/01     | 8/31/03            |
| X | Receiver, Blue Tower Spectrum Analyzer (Blue) | HP               | 8568B         | 2928A04729<br>2848A18049 | CHAR 10/22/01   | 10/22/03           |
| X | RF Preselector (Blue)                         | HP               | 85685A        | 2926A00983               | CHAR 10/22/01   | 10/22/03           |
| X | Quasi-Peak Adapter (Blue)                     | HP               | 85650A        | 2811A01279               | CHAR 10/22/01   | 10/22/03           |
| X | Biconnical Antenna                            | Electro-Metrics  | BIA-25        | 1171                     | CAL 4/26/01     | 4/26/03            |
|   | Biconnical Antenna                            | Eaton            | 94455-1       | 1096                     | CAL 10/1/01     | 10/1/03            |
|   | Biconnical Antenna                            | Eaton            | 94455-1       | 1057                     | CHAR 3/15/00    | 3/15/02            |
|   | BiconiLog Antenna                             | EMCO             | 3143          | 9409-1043                |                 |                    |
| X | Log-Periodic Antenna                          | Electro-Metrics  | LPA-25        | 1122                     | CAL 10/2/01     | 10/2/03            |
|   | Log-Periodic Antenna                          | Electro-Metrics  | EM-6950       | 632                      | CHAR 10/15/01   | 10/15/03           |
|   | Log-Periodic Antenna                          | Electro-Metrics  | LPA-30        | 409                      | CHAR 10/16/01   | 10/16/03           |
|   | Dipole Antenna Kit                            | Electro-Metrics  | TDA-30/1-4    | 152                      | CAL 3/21/01     | 3/21/04            |
|   | Dipole Antenna Kit                            | Electro-Metrics  | TDA-30/1-4    | 153                      | CHAR 11/24/00   | 11/24/03           |
|   | Double-Ridged Horn Antenna                    | Electro-Metrics  | RGA -180      | 2319                     | CAL 12/19/01    | 12/19/03           |
|   | Horn Antenna                                  | Electro-Metrics  | EM-6961       | 6246                     | CAL 3/21/01     | 3/21/03            |
|   | Horn Antenna                                  | ATM              | 19-443-6R     | None                     | No Cal Required |                    |
|   | Passive Loop Antenna                          | EMC Test Systems | EMCO 6512     | 9706-1211                | CHAR 7/10/01    | 7/10/03            |

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|   | DEVICE                                | MFGR                           | MODEL       | SERNO      | CAL/CHAR<br>DATE | DUE DATE<br>or STATUS |
|---|---------------------------------------|--------------------------------|-------------|------------|------------------|-----------------------|
|   | Line Impedance<br>Stabilization . . . | Electro-Metrics                | ANS-25/2    | 2604       | CAL<br>10/9/01   | 10/9/03               |
|   | Line Impedance<br>Stabilization . . . | Electro-Metrics                | EM-7820     | 2682       | CAL<br>3/16/01   | 3/16/03               |
|   | Termaline Wattmeter                   | Bird Electronic<br>Corporation | 611         | 16405      | CAL<br>5/25/99   | 5/25/01               |
|   | Termaline Wattmeter                   | Bird Electronic<br>Corporation | 6104        | 1926       | CAL<br>12/12/01  | 12/12/03              |
|   | Oscilloscope                          | Tektronix                      | 2230        | 300572     | CHAR<br>2/1/01   | 2/1/03                |
| X | Temperature Chamber                   | Tenney Engineering             | TTRC        | 11717-7    | CHAR<br>1/22/02  | 1/22/04               |
|   | AC Voltmeter                          | HP                             | 400FL       | 2213A14499 | CAL<br>10/9/01   | 10/9/03               |
|   | AC Voltmeter                          | HP                             | 400FL       | 2213A14261 | CHAR<br>10/15/01 | 10/15/03              |
|   | AC Voltmeter                          | HP                             | 400FL       | 2213A14728 | CHAR<br>10/15/01 | 10/15/03              |
| X | Digital Multimeter                    | Fluke                          | 77          | 35053830   | CHAR<br>1/8/02   | 1/8/04                |
|   | Digital Multimeter                    | Fluke                          | 77          | 43850817   | CHAR<br>1/8/02   | 1/8/04                |
|   | Digital Multimeter                    | HP                             | E2377A      | 2927J05849 | CHAR<br>1/8/02   | 1/8/04                |
|   | Multimeter                            | Fluke                          | FLUKE-77-3  | 79510405   | CAL<br>9/26/01   | 9/26/03               |
|   | Peak Power Meter                      | HP                             | 8900C       | 2131A00545 | CHAR<br>1/26/01  | 1/26/03               |
|   | Digital Thermometer                   | Fluke                          | 2166A       | 42032      | CAL<br>1/16/02   | 1/16/04               |
|   | Thermometer                           | Traulsen                       | SK-128      |            | CHAR<br>1/22/02  | 1/22/04               |
| X | Temp/Humidity gauge                   | EXTech                         | 44577F      | E000901    | CHAR<br>1/22/02  | 1/22/04               |
|   | Frequency Counter                     | HP                             | 5352B       | 2632A00165 | CAL<br>11/28/01  | 11/28/03              |
|   | Power Sensor                          | Agilent<br>Technologies        | 84811A      | 2551A02705 | CAL<br>1/26/01   | 1/26/03               |
|   | Service Monitor                       | IFR                            | FM/AM 500A  | 5182       | CAL<br>11/22/00  | 11/22/02              |
|   | Comm. Serv. Monitor                   | IFR                            | FM/AM 1200S | 6593       | CAL<br>5/12/02   | 5/12/04               |
|   | Signal Generator                      | HP                             | 8640B       | 2308A21464 | CAL<br>11/15/01  | 11/15/03              |
|   | Modulation Analyzer                   | HP                             | 8901A       | 3435A06868 | CAL<br>9/5/01    | 9/5/03                |

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|  | DEVICE               | MFGR                | MODEL                | SERNO      | CAL/CHAR<br>DATE | DUE DATE<br>or STATUS |
|--|----------------------|---------------------|----------------------|------------|------------------|-----------------------|
|  | Near Field Probe     | HP                  | HP11940A             | 2650A02748 | CHAR<br>2/1/01   | 2/1/03                |
|  | BandReject Filter    | Lorch Microwave     | 5BR4-2400/<br>60-N   | Z1         | CHAR<br>3/2/01   | 3/2/03                |
|  | BandReject Filter    | Lorch<br>Microwave  | 6BR6-2442/<br>300-N  | Z1         | CHAR<br>3/2/01   | 3/2/03                |
|  | BandReject Filter    | Lorch<br>Microwave  | 5BR4-10525/<br>900-S | Z1         | CHAR<br>3/2/01   | 3/2/03                |
|  | High Pas Filter      | Microlab            | HA-10N               |            | CHAR<br>10/4/01  | 10/4/03               |
|  | Audio Oscillator     | HP                  | 653A                 | 832-00260  | CHAR<br>3/1/01   | 3/1/03                |
|  | Frequency Counter    | HP                  | 5382A                | 1620A03535 | CHAR<br>3/2/01   | 3/2/03                |
|  | Frequency Counter    | HP                  | 5385A                | 3242A07460 | CHAR<br>12/11/01 | 12/11/03              |
|  | Preamplifier         | HP                  | 8449B-H02            | 3008A00372 | CHAR<br>3/4/01   | 3/4/03                |
|  | Amplifier            | HP                  | 11975A               | 2738A01969 | CHAR<br>3/1/01   | 3/1/03                |
|  | Egg Timer            | Unk                 |                      |            | CHAR<br>8/31/01  | 8/31/03               |
|  | Measuring Tape, 20M  | Kraftixx            | 0631-20              |            | CHAR<br>2/1/02   | 2/1/04                |
|  | Measuring Tape, 7.5M | Kraftixx            | 7.5M PROFI           |            | 2/1/02           | 2/1/04                |
|  | Coaxial Cable #51    | Insulated Wire Inc. | NPS 2251-2880        | Timco #51  | CHAR<br>1/23/02  | 1/23/04               |
|  | Coaxial Cable #64    | Semflex Inc.        | 60637                | Timco #64  | CHAR<br>1/24/02  | 1/24/04               |
|  | Coaxial Cable #65    | General Cable Co.   | E9917 RG233/U        | Timco #65  | CHAR<br>1/23/02  | 1/23/04               |
|  | Coaxial Cable #106   | Unknown             | Unknown              | Timco #106 | CHAR<br>1/23/02  | 1/23/04               |

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