# TEST REPORT

Report Number: 100052703ATL-001

February 28, 2010

**Product Designation: LiveCycle Transmitter**

Standard: FCC 15.249 - Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHZ, and 24.0-24.25 GHz.
RSS-210, Issue 7, 2007


Tested by:
Intertek Testing Services NA Inc.
1950 Evergreen Blvd., Suite 100
Duluth, GA 30096

Client:
New Potato Technologies
424 Landmark Drive
Wilmington, NC 28412
Contact: Stuart Ross
Phone: 910.399.7073
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Tests performed by:

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EMC Department Managerr

Report reviewed by:

Chris D. Capelle
Senior Project Engineer

## 1.0 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatum text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complies with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

## 2.0 Test Summary

| Section | Test Full Name | Test Date | Result |
|---|---|---|---|
| 4.0 | System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup) | | |
| 5.0 | Overview of EUT (Low Power Transmitters) (FCC 15C - EUT Overview) | | |
| 6.0 | Duty Cycle Determination (FCC 15A - 15.35(c)) | 02/28/2010 | |
| 7.0 | Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD) | 02/28/2010 | PASS |
| 8.0 | Occupied Bandwidth (FCC Part 2.1049) | 02/28/2010 | PASS |
| NA | Conducted emissions on AC power lines (Conducted Emissions) was waived due to the device is battery-powered. | | |
| NA | 15.249(b): Requirements for fixed, point-to-point operation (FCC 15C - 15.249(b)) was waived due to the EUT is a mobile device. | | |

## 3.0 Description of Equipment Under Test

| Equipment Under Test | | | |
|---|---|---|---|
| Description | Manufacturer | Model Number | Serial Number |
| Cycle Computer Transmitter | New Potato Technologies | LiveCycle Tx | Not Labeled |

| | |
|---|---|
| EUT receive date: | February 25, 2010 |
| EUT receive condition: | Good |

Description of EUT provided by Client:
The LiveCycle system uses the iPhone or iTouch as a cycling computer. The receiver connected directly to iPhone/iTouch, and the transmitter connects to the pedal crank of the bicycle. The transmitter receives magnetic stimulus from the wheel and pedal crank and the transmitted data is used to calculate speed, cadence, power usage, etc.

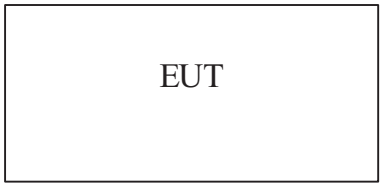
Description of EUT exercising:
The transmitter was configured to transmit packets every 100ms.

## 4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

**Method:**

Record the details of EUTcabling, document the support equipment, and show the interconnections in a block diagram.

**Drawing:**




Setup Diagram

## 4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

**Data:**

| EUT Cabling | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | Connection | |
| ID | Description | Length | Shielding | Ferrites | From | To |
| No interface cabling | | | | | | |

| Support Equipment | | | |
|---|---|---|---|
| Description | Manufacturer | Model Number | Serial Number |
| None Required | | | |

## 5.0 Overview of EUT (Low Power Transmitters) (FCC 15C - EUT Overview)

**Method:**

Complete the overview spreadsheet.

Related Submittal(s) Grants: This report is for use with an application for certification of a low power transmitter. One transmitter is included in the application.

**Data:**

| | |
|---|---|
| Applicant | New Potato Technologies |
| | 424 Lanmark Drive |
| | Wilmington, NC 28412 |
| Trade Name & Model No. | LiveCycle Tx |
| FCC Identifier | TBD |
| Frequency Range (MHz) | 2480 |
| Antenna Type (15.203) | Integral |
| Manufacturer name & address | New Potato Technologies |
| | 424 Lanmark Drive |
| | Wilmington, NC 28412 |

| | |
|---|---|
| Related Submittals and Grants: | This report is for use with an application for certification of a low power transmitter. One transmitter is included in the application. |
| Additions, deviations and exclusions from standards | |

## 6.0 Duty Cycle Determination (FCC 15A - 15.35(c))

### Method:

(c) Unless otherwise specified, e.g. §15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

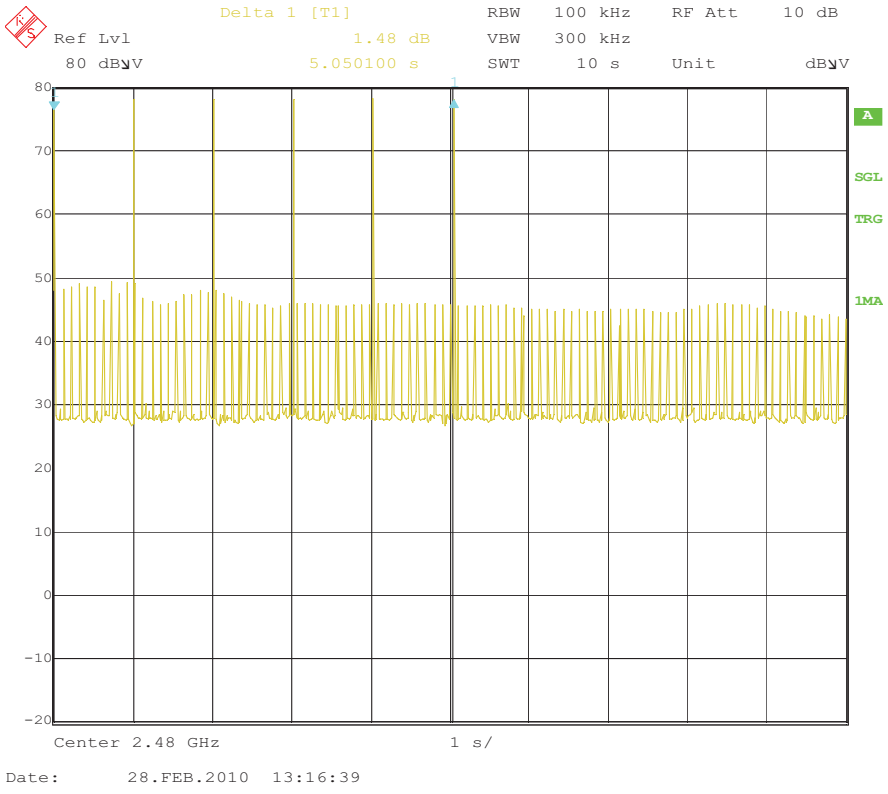
Determine the period of the pulse train, T, in mSec and record the results. T is defined as the time from the beginning of one pulse train to the beginning of the next pulse train.

Count the number of different types of pulses, N and record the results.

For each of the different types of pulses, count the number of occurrences within one pulse train.

Use the Duty Cycle Correction Factor, DCCF, from the results table and use it to adjust the field strength measurements recorded for radiated emissions.

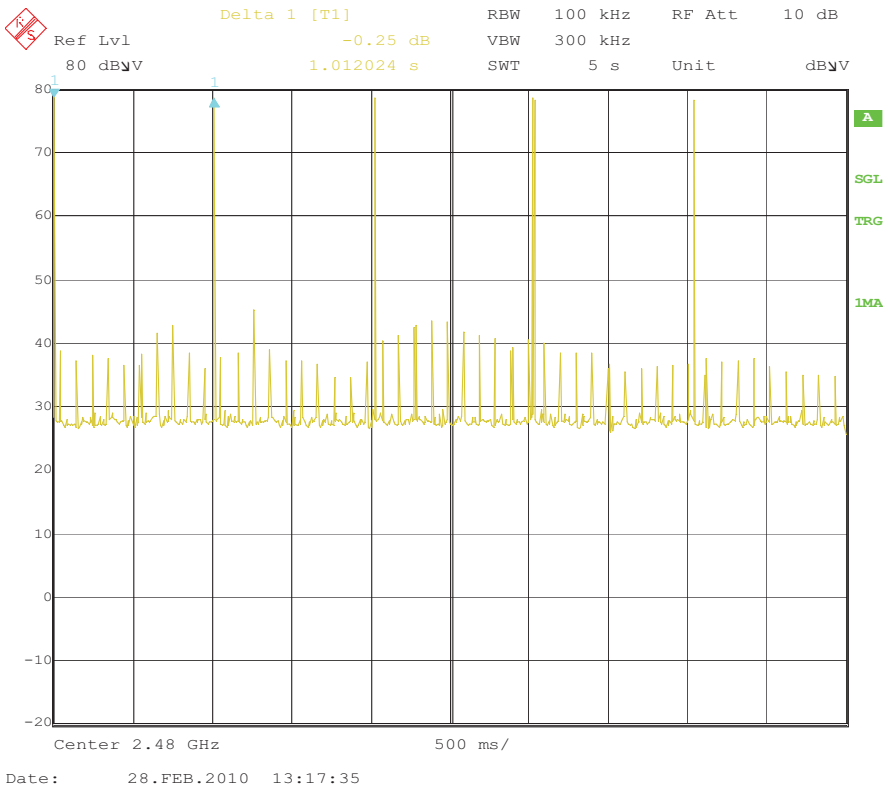
### Plot:




10 Second Plot (Shows 5 seconds of pulses)

## 6.0 Duty Cycle Determination (FCC 15A - 15.35(c))

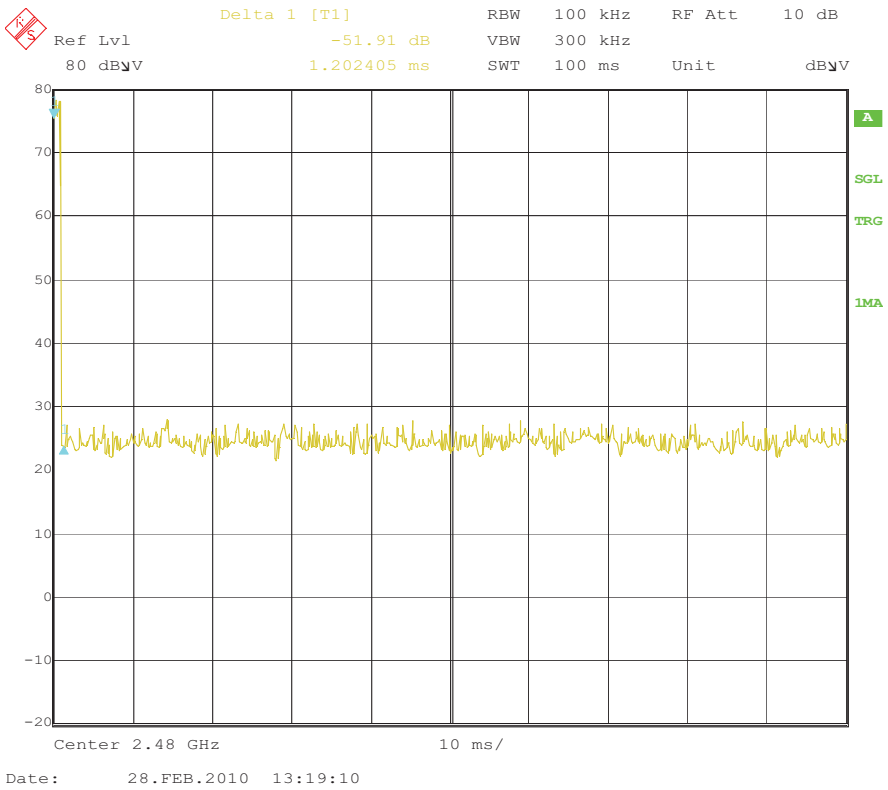
**Plot:**




5 second Plot (Shows 1 Second Puls Spacing)

## 6.0 Duty Cycle Determination (FCC 15A - 15.35(c))

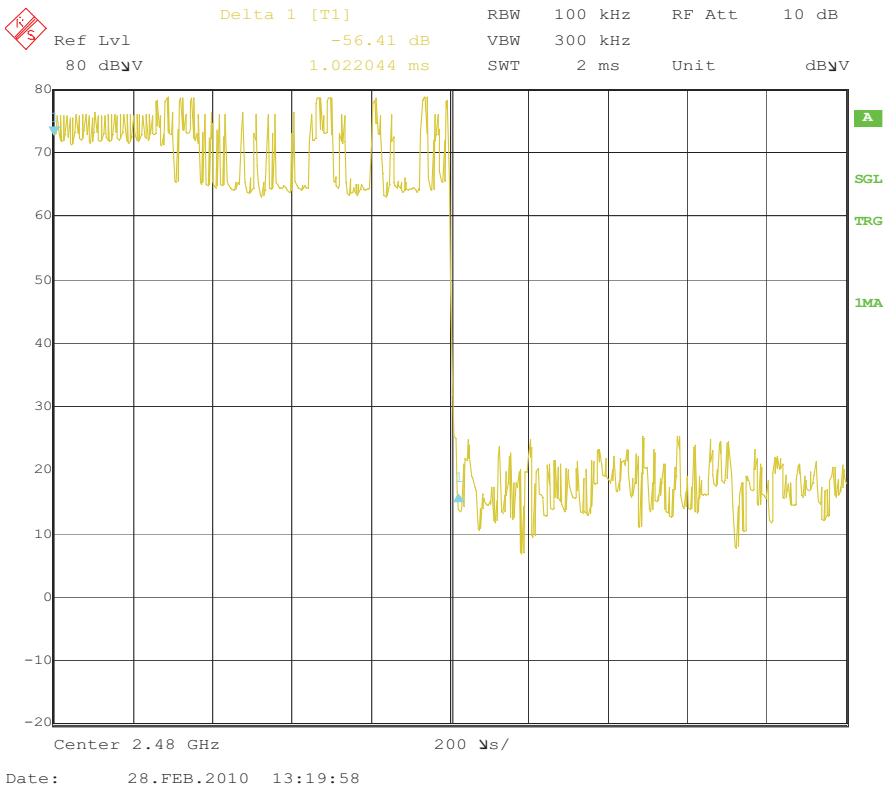
**Plot:**




100ms Plot

## 6.0 Duty Cycle Determination (FCC 15A - 15.35(c))

**Plot:**




2ms Plot

## 6.0 Duty Cycle Determination (FCC 15A - 15.35(c))

**Data:**

| | |
|---|---|
| Duration of Pulse Train, T (mSec): | 1012 |
| Averaging Interval, $A_I$ (mSec): | 100 |
| Number of different Pulses, N: | 1 |

| | Number ($\#P_x$) | Pulse Width, mSec ($PW_x$) | Product ($\#P_x$)*($PW_x$) |
|---|---|---|---|
| Pulse Width 1 | 1 | 1.022 | 1.022 |
| Pulse Width 2 | | | |
| Pulse Width 3 | | | |
| Pulse Width 4 | | | |
| Pulse Width 5 | | | |
| Pulse Width 6 | | | |
| Pulse Width 7 | | | |
| Pulse Width 8 | | | |
| Pulse Width 9 | | | |
| Pulse Width 10 | | | |

| | |
|---|---|
| Duty Cycle: | 0.01022 |
| Duty Cycle Correction Factor, dB: | -39.8 |

$$T_{on} = (PW_1 * \#P)_1 + (PW_{2*} * \#P_2) + \cdots + (PW_n * \#P_n)$$

$$DutyCycle = T_{on} \div A_I$$

$$DCCF = 20 * Log_{10}(DutyCycle)$$

## 7.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

### Method:

Measurements shall be performed with a quasi-peak detector instrument that meets the requirements of Section One of CISPR 16.

Bandwidths:
30 MHz to 1000 MHz: 120 kHz RBW and 1 MHz VBW
Above 1000 MHz: 1 MHz RBW and 3 MHz VBW

Detectors:
Equal to or less than 1000 MHz: CISPR quasi-peak detector (alternative: peak detector)
Above 1000 MHz: Average detector (applies to average limit)
Above 1000 MHz: Peak detector (applies to peak limit)

Limits:
Equal to or less than 1000 MHz, the limits are specified as quasi-peak. If a peak detector is used, the limit does not change.
Above 1000 MHz, the limits are specified as average. The peak limit is 20 dB above the average limit. Both peak and average measurements are required to be reported.

Frequency range of radiated measurements
For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in this paragraph:

(1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

(3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.

(4) If the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to the range specified in paragraphs (a)(1) through (a)(3) of this section or the range applicable to the digital device, as shown in paragraph (b)(1) of this section, whichever is the higher frequency range of investigation.

Measurement antenna requirements:
Below 30 MHz - Loop antenna
30 to 1000 MHz - Biconical, Log Periodic, or equivalent
Above 1000 MHz - Horn or equivalent

Measurements of the radiated field are made with the antenna located at a distance of 3 or 10 meters from the EUT. The limit applied to the measurement shall be appropriate for the test distance. The test distance shall be indicated in the results section.

The EUT shall be arranged and connected with cables terminated in accordance with the product specification.

Exploratory tests should be carried out while varying the cable positions to determine the maximum or near-maximum emission level. During manipulation, cables shall not be placed under or on top of the system test components unless such placement is required by the inherent equipment design.

The antenna shall be adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.

The antenna-to-EUT azimuth shall be varied during the measurement to find the maximum field-strength readings.

The antenna-to-EUT polarization (horizontal and vertical) shall be varied during the measurements to find the maximum field-strength readings.

If the EUT is handheld, it shall be oriented in each of its othogonal axes.

If the EUT is intended for tabletop use, it shall be placed on a table whose top is 0.8m above the ground plane. The table shall be constructed of non-conductive materials. Its dimensions are at least 1m by 1.5m, but may be extended for larger EUT.

If EUT is floor standing, the EUT was placed on a horizontal metal ground plane and isolated from the ground plane by up to 12 mm of insulating material.

Equipment setup for radiated disturbance tests shall follow the guidelines of ANSI C63.4:2003.

TEST SITE
The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096.

### Test Equipment Used:

| Description: | Manufacturer: | Model: | Asset Number: | Cal Date: | Cal Due: |
|---|---|---|---|---|---|
| Antenna, BiLog, 20-2000MHz | Chase | CBL6112B | 211386 | 10/02/2009 | 10/02/2010 |

## 7.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

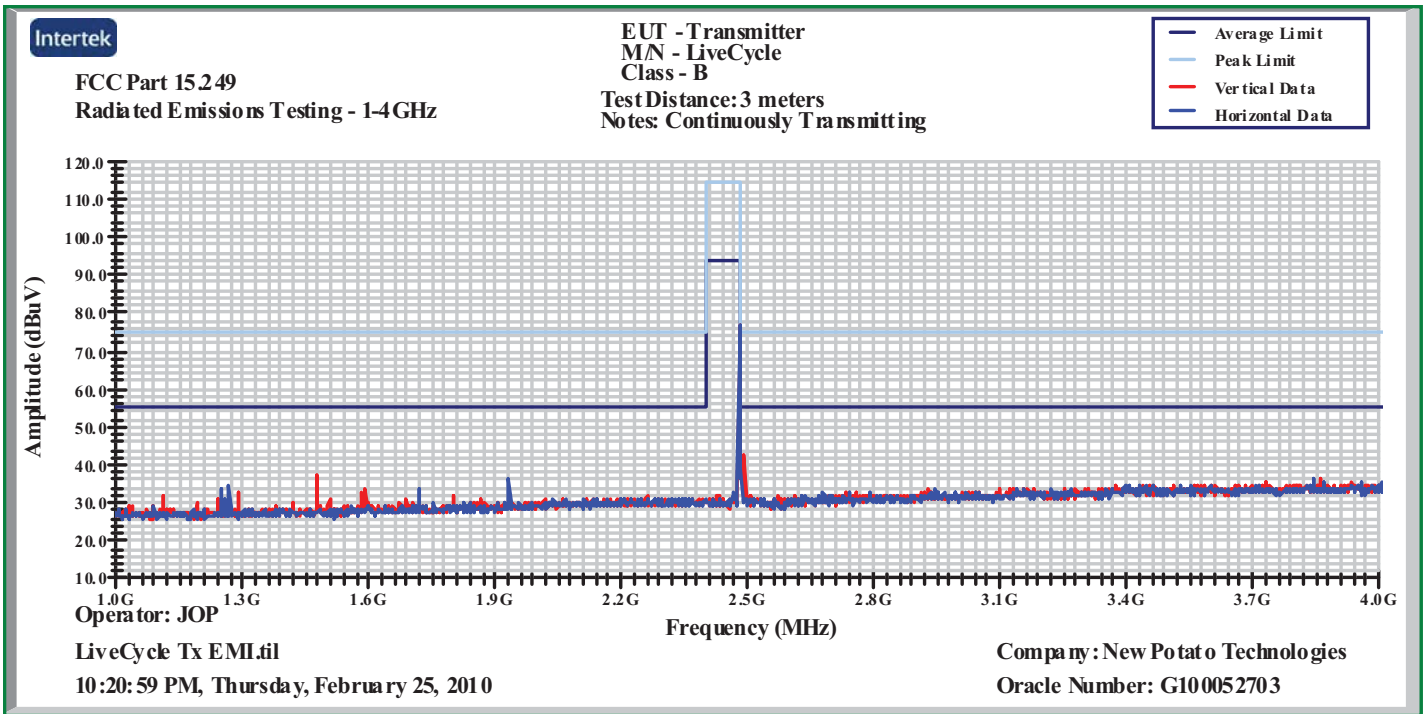
**Test Equipment Used:**

| Description: | Manufacturer: | Model: | Asset Number: | Cal Date: | Cal Due: |
|---|---|---|---|---|---|
| Antenna, Horn, <18 GHz | EMCO | 3115 | 213061 | 04/30/2009 | 04/30/2010 |
| Antenna, Horn, 18-40 GHz | EMCO | 3116 | 213023 | 05/29/2009 | 05/29/2010 |
| Cable E01, <18GHz | Pasternack | RG214/U | E01 | 05/04/2009 | 05/04/2010 |
| Cable E404, 40 GHz, 2.9, 2m | Megaphase | TM40 K1K1 80 | E404 | 06/08/2009 | 06/08/2010 |
| Cable MP3, 18 GHz, N, 10m | Megaphase | G919-NKNK-394 | MP3 | 05/04/2009 | 05/04/2010 |
| Cable, 7 meters, 1-18GHz | Storm Products Co. | PR90-241-7MTR | ST-2 | 08/18/2009 | 08/18/2010 |
| EMI Receiver | Hewlett Packard | 8546A | 213109 | 10/06/2009 | 10/06/2010 |
| EMI Receiver, Preselector section | Hewlett Packard | 85460A | 213108 | 10/06/2009 | 10/06/2010 |
| Excel spreadsheet for radiated emissions | Software | Excel - RE Worksh | SW004 | 12/09/2009 | 12/09/2010 |
| Filter, 4 GHz High Pass | Reactel, Inc. | 7HS-4G/18G-S11 | 213153a | 04/01/2009 | 04/01/2010 |
| Preamplifier, 18-40GHz, 29 dB Gain | Miteq | JS41800400-30-5P | 200106 | 09/21/2009 | 09/21/2010 |
| Preamplifier, 20 MHz to 18 GHz, 40 dB | A.H. Systems | PAM-0118 | 200108 | 04/07/2009 | 04/07/2010 |
| Spectrum Analyzer, 20Hz-40GHz | Rohde & Schwarz | FSEK30 | 200062 | 10/19/2009 | 10/19/2010 |
| Tile - software profile for radiated and conducted emissions testing. | Software | Tile - Emissions | SW006 | 12/09/2009 | 12/09/2010 |

**Results: The sample tested was found to Comply.**

## 7.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

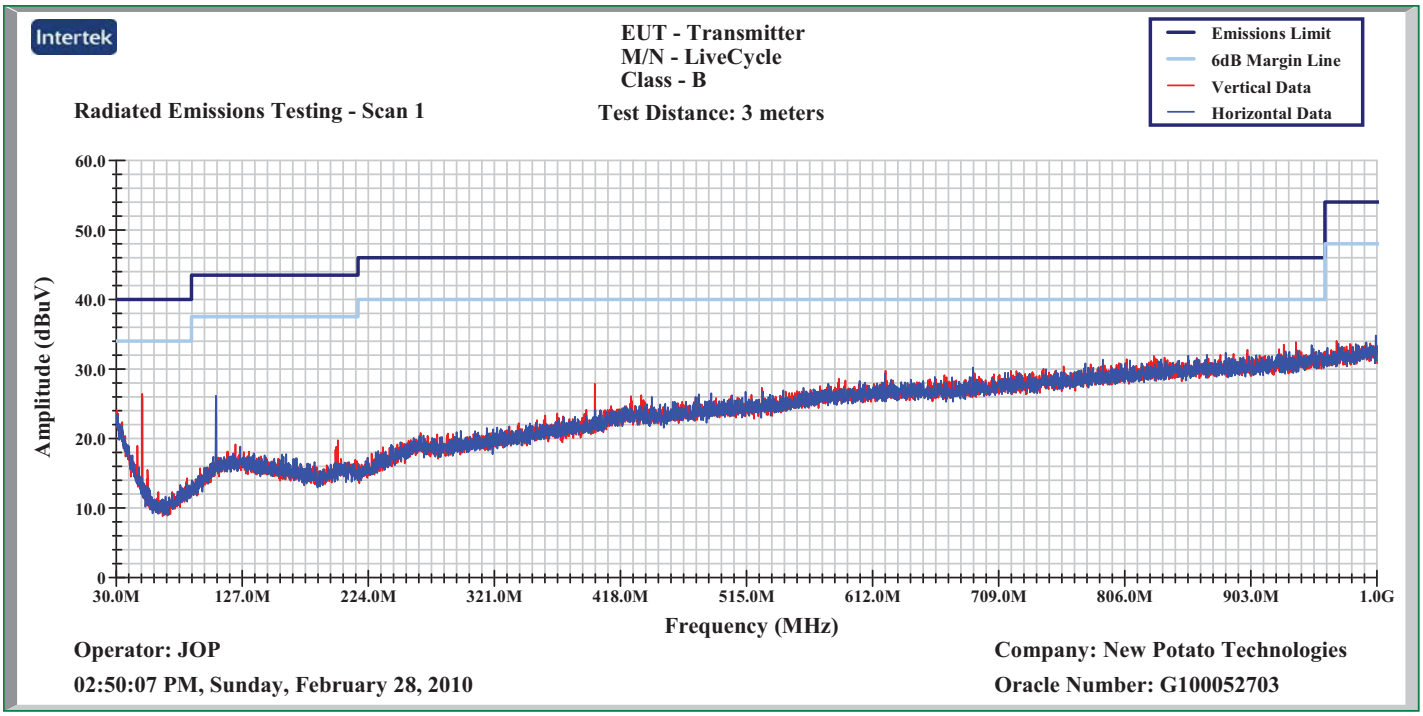
**Photo:**




Peak Plot - 1-4GHz

## 7.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

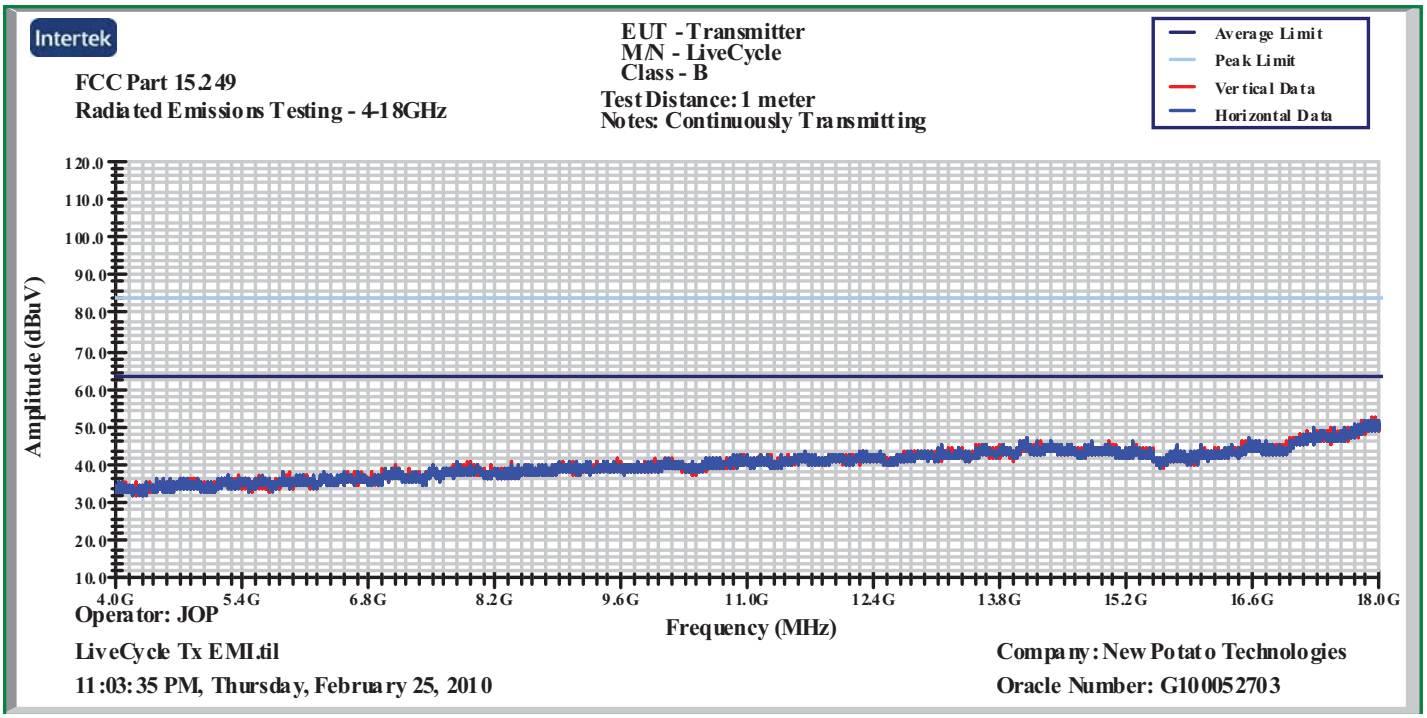
**Plot:**




Peak Plot - 30-1000MHz

## 7.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

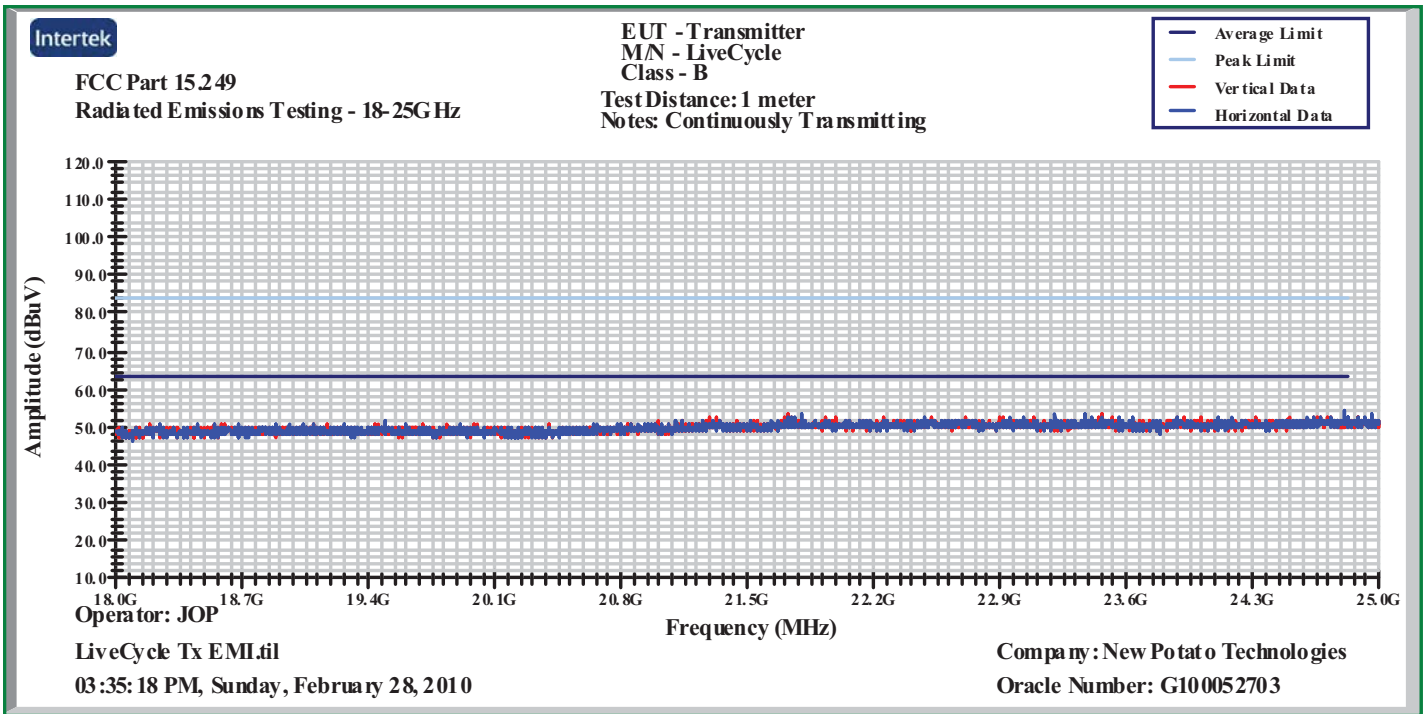
**Plot:**




Peak Plot - 4-18GHz

## 7.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

**Plot:**




Peak Plot - 18-25GHz

## 7.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

**Data:**

**Date:** 2/25/2010 **Test Distance (m):** 3
**Frequency Range (MHz):** 30-25000 **Limit:** 15.249
**Input power:** Battery **Modifications for compliance (y/n):** n

| A | B | C | D | E | F | G | H | I | J | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Ant. Pol. (V/H)** | **Frequency MHz** | **Reading dB(uV)** | **Antenna Factor dB(1/m)** | **Cable Loss dB** | **Duty Cycle Factor dB** | **Net dB(uV/m)** | **Limit dB(uV/m)** | **Margin dB** | **Detectors / Bandwidths Det/RBW/VBW** | |
| v | 2480.025 | 52.6 | 27.9 | 7.5 | 0.0 | 88.0 | 114.0 | -26.0 | Pk/1M/3M | X-axis |
| v | 2480.025 | 52.6 | 27.9 | 7.5 | 39.8 | 48.2 | 94.0 | -45.8 | Pk/1M/3M | X-axis |
| h | 2480.025 | 56.4 | 27.9 | 7.5 | 0.0 | 91.8 | 114.0 | -22.2 | Pk/1M/3M | X-axis |
| h | 2480.025 | 56.4 | 27.9 | 7.5 | 39.8 | 52.0 | 94.0 | -42.0 | Pk/1M/3M | X-axis |
| v | 2480.025 | 49.5 | 27.9 | 7.5 | 0.0 | 84.9 | 114.0 | -29.1 | Pk/1M/3M | Y-Axis |
| v | 2480.025 | 49.5 | 27.9 | 7.5 | 39.8 | 45.1 | 94.0 | -48.9 | Pk/1M/3M | Y-Axis |
| h | 2480.025 | 57.4 | 27.9 | 7.5 | 0.0 | 92.8 | 114.0 | -21.2 | Pk/1M/3M | Y-Axis |
| h | 2480.025 | 57.4 | 27.9 | 7.5 | 39.8 | 53.0 | 94.0 | -41.0 | Pk/1M/3M | Y-Axis |
| v | 2480.025 | 53.0 | 27.9 | 7.5 | 0.0 | 88.4 | 114.0 | -25.6 | Pk/1M/3M | Z-Axis |
| v | 2480.025 | 53.0 | 27.9 | 7.5 | 39.8 | 48.6 | 94.0 | -45.4 | Pk/1M/3M | Z-Axis |
| h | 2480.025 | 51.7 | 27.9 | 7.5 | 0.0 | 87.1 | 114.0 | -26.9 | Pk/1M/3M | Z-Axis |
| h | 2480.025 | 51.7 | 27.9 | 7.5 | 39.8 | 47.3 | 94.0 | -46.7 | Pk/1M/3M | Z-Axis |
| **Calculations** | | G=C+D+E-F | | I=G-H | | | | | | |

## 8.0 Occupied Bandwidth (FCC Part 2.1049)

### Method:

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Connect the antenna port of the EUT to a spectrum analyzer using a calibrated coaxial cable and attenuator. Set the EUT to transmit at its highest power setting. The 99% bandwidth function of the analyzer was used to automatically generate the occupied bandwidth plots. Repeat for low, mid, and high channels of each band of the EUT.

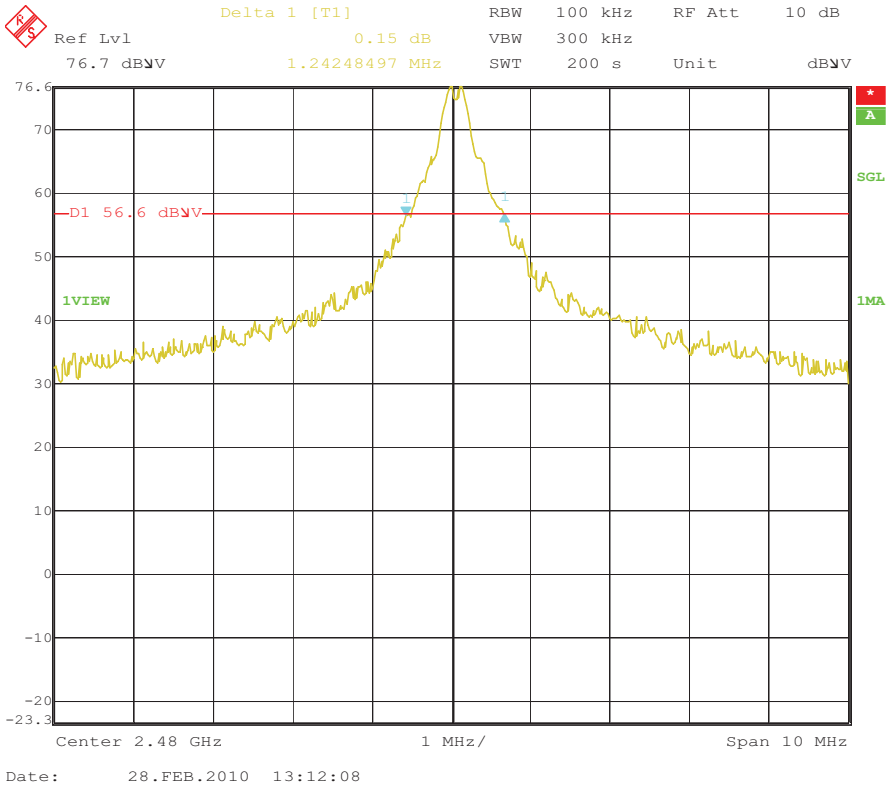
For amplifiers, the output bandwidth shall be less than or equal to the input bandwidth.

### Test Equipment Used:

| Description: | Manufacturer: | Model: | Asset Number: | Cal Date: | Cal Due: |
|---|---|---|---|---|---|
| Spectrum Analyzer, 20Hz-40GHz | Rohde & Schwarz | FSEK30 | 200062 | 10/19/2009 | 10/19/2010 |

### Results: The sample tested was found to Comply.

### Plot:




Bandwidth

## 8.0 Occupied Bandwidth (FCC Part 2.1049)

**Data:**

| Mode | Frequency MHz | Resolution Bandwidth (1) | Video Bandwidth | Sweep time Seconds | Measured Bandwidth MHz |
|---|---|---|---|---|---|
| Continuous Tx | 2480 | 30 kHz | 300 kHz | 200 | 1.242 |

Note (1): Greater or equal to 1% of emission bandwidth.