

# Intertek ETL SEMKO

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October 17, 2006

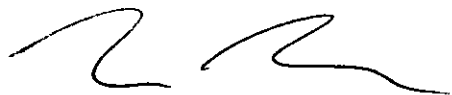
Mr. John Davino  
Timex Corporation  
555 Christian Road PO Box 310  
Middlebury, CT 06762-0310

Mr. Davino;

Enclosed you will find our EMC data report covering testing on the HRM Chest Strap, Model: M640.  
Testing was performed on September 13<sup>th</sup> – Oct. 17<sup>th</sup>, 2006.

If there are any questions regarding this report, please contact the undersigned or your account representative.

Sincerely,



Nicholas Abbondante  
Project Engineer



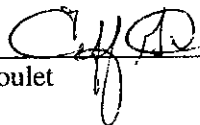
Jeff Goulet  
Engineering Team Leader, EMC

Enclosure



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**EMC TEST REPORT****Report Number: 3104393BOX-001a****Project Number: 3104393****Testing performed on the****HRM Chest Strap****Model: M640****To****AS/NZS 4268:2003****CENELEC EN 55022:1998****CENELEC EN 55024:1998****ETSI EN 300 330-1 V1.3.2 (2002-12)****ETSI EN 300 330-2 V1.2.1 (2004-11)****ETSI EN 301 489-1 V1.6.1 (2005-09)****ETSI EN 301 489-3 V1.4.1 (2002-08)****FCC Part 15 Subpart C 15.209****Industry Canada RSS-210 Issue 6 September 2005****For****Timex Corporation****Test Performed by:****Intertek – ETL SEMKO****70 Codman Hill Road****Boxborough, MA 01719****Test Authorized by:****Timex Corporation****555 Christian Road PO Box 310****Middlebury, CT 06762-0310****Prepared by:****Nicholas Abbondante****Date:****20/17/06****Reviewed by:****Jeff Goulet****Date:****10-17-06**

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## 1.0 Job Description

### 1.1 Client Information

This EUT has been tested at the request of:

**Company:** Timex Corporation  
555 Christian Road  
PO Box 310  
Middlebury, CT 06762-0310  
**Contact:** John Davino  
**Telephone:** 203-346-4340  
**Fax:** 203-346-7146  
**Email:** [jdavino@timex.com](mailto:jdavino@timex.com)

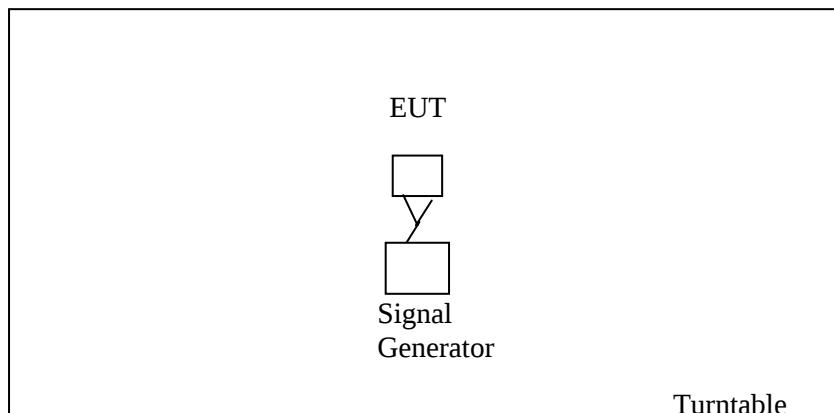
### 1.2 Equipment Under Test

**Equipment Type:** HRM Chest Strap  
**Model Number(s):** M640  
**Serial number(s):** 6  
**Manufacturer:** Timex Corporation  
**EUT receive date:** 09/12/2006  
**EUT received condition:** Prototype in good condition  
**Test start date:** 09/13/2006  
**Test end date:** 10/17/2006

**1.3 Test Plan Reference:** Tested according to the standards listed, ANSI C63.4:2003, ERC/REC 70-03 November 2005, RSS-Gen Issue 1 September 2005, New Zealand Radiocommunications Notice 2005 No. 2, and ETSI EN 300 330-1 V1.3.2 (2002-12).

### 1.4 Test Configuration

#### 1.4.1 Block Diagram



#### 1.4.2. Cables:

| Cable                  | Shielding | Connector        | Length (m) | Qty. |
|------------------------|-----------|------------------|------------|------|
| DC Power Cables        | None      | Wire             | 0.15       | 2    |
| Signal Generator Cable | Coaxial   | BNC to 2-wire DC | 0.3        | 1    |

#### 1.4.3. Support Equipment:

Name: HRM Signal Generator  
 Model No.: HRM Generator  
 Serial No.: N/L

Name: Lambda DC Power Supply  
 Model No.: LQD-423  
 Serial No.: C96143

Name: Timex Fitness HRM Wristwatch  
 Model No.: 686-5J0410  
 Serial No.: N/L

#### 1.5 Mode(s) of Operation:

The EUT was activated from a fresh 3 Volt battery for all testing except for the frequency stability test, which used a DC power supply to vary the input power around 3 VDC. The EUT was investigated in 3 orthogonal axes. The Signal Generator support equipment was connected to the sensor pads on the EUT via alligator clips which delivered a 2 Hz signal to the device. This caused the EUT to transmit a typical signal on a 2 second interval. The watch receiver was used to verify continuing transmission via the display which showed the Beats Per Minute (BPM) value that the EUT transmitted, 120 BPM for the 2 Hz signal input.

**1.5a EUT Cycle Time:** 2 Seconds

#### 1.6 Monitoring of Sample:

The EUT was monitored via the watch receiver display which showed the BPM value which was detected by the EUT and transmitted to the watch receiver.

### 1.7 Sample Performance Criteria:

#### EN 55024 Performance Criteria

- Criterion A: The EUT must not be affected by the test disturbance.
- Criterion B: The EUT may be affected by the test disturbance, but must resume normal operation when the test disturbance is removed.
- Criterion C: The EUT may be affected by the test disturbance and may require operator intervention to resume normal operation.

Per Clause 6.1 of ETSI EN 301 489-1 V1.6.1 (2005-09)

During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intended.

During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data.

Since the EUT is used for fitness purposes and not medical diagnostics, small errors in the Beats Per Minute value would be insignificant, and large variations would be obvious to the user as an erroneous result.

**1.8 Floor Standing Equipment:**                      Applicable: \_\_\_\_\_                      Not Applicable:  X

For floor standing equipment, 40cm RFI field uniformity data is located in the chamber equipment folder.

## 2.0 Test Summary

| TEST STANDARD                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>AS/NZS 4268:2003</b><br><b>CENELEC EN 55022:1998 &amp; CENELEC EN 55024:1998</b><br><b>ETSI EN 300 330-1 V1.3.2 (2002-12) &amp; ETSI EN 300 330-2 V1.2.1 (2004-11)</b><br><b>ETSI EN 301 489-1 V1.6.1 (2005-09) &amp; ETSI EN 301 489-3 V1.4.1 (2002-08)</b><br><b>FCC Part 15 Subpart C 15.209</b><br><b>Industry Canada RSS-210 Issue 6 September 2005</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |
| SUB-TEST                                                                                                                                                                                                                                                                                                                                                        | TEST PARAMETER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | NOTE |
| <b>AS/NZS 4268</b><br><b>ETSI EN 300 330-1</b><br><b>ETSI EN 300 330-2</b><br><b>FCC Part 15 Subpart C</b><br><b>Industry Canada RSS-210</b>                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |
| RF Output Power and Spurious Emissions Below 30 MHz<br>AS/NZS 4268 5.4, 8.2<br>ETSI EN 300 330-1 7.2, 7.4<br>ERC/REC 70-03 Annex 9<br>FCC 15.205, 15.209<br>IC RSS-210 2.7                                                                                                                                                                                      | AS/NZS: The fundamental field strength must not exceed 3 uW (18.5 dBuA/m at 3m) in Australia and 10 mW in New Zealand. The spurious emissions must not exceed 0.1 uW (-40 dBm) in Australia and 2.25 uW in New Zealand.<br>ETSI: The fundamental field strength at 137.5 kHz must not exceed 73.4 dBuA/m (ERC/REC 70-03) or 46.6 dBuA/m and the fundamental field strength at 141 kHz must not exceed 69.1 dBuA/m (ERC/REC 70-03) or 46.5 dBuA/m at 3 meters. The field strength of spurious emissions must not exceed 27 dBuA/m at 9 kHz descending 3 dB/Octave at 10 meters.<br>FCC: Emissions must be below the 15.209 limits.<br>IC: Emissions must be below the RSS-210 2.7 Table 3 limits. | Pass |
| Spurious Emissions Above 30 MHz<br>AS/NZS 4268 8.2<br>ETSI EN 300 330-1 7.4<br>FCC 15.205, 15.209<br>IC RSS-210 2.7                                                                                                                                                                                                                                             | AS/NZS: The spurious emissions must not exceed 0.1 uW (-40 dBm) in Australia and 2.25 uW in New Zealand.<br>ETSI: The spurious emissions must not exceed 250 nW (-36.0 dBm), except in the ranges from 47-74, 87.5-118, 174-230, and 470-862 MHz, where the limit is 4 nW (-54.0 dBm).<br>FCC: Emissions must be below the 15.209 limits.<br>IC: Emissions must be below the RSS-210 2.7 Table 2 limits.                                                                                                                                                                                                                                                                                         | Pass |
| Occupied Bandwidth<br>AS/NZS 4268 8.3<br>FCC 15.215<br>IC RSS-Gen 4.4.1                                                                                                                                                                                                                                                                                         | There is no limit on bandwidth.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Pass |
| Operating Frequencies/ Permitted Frequency Range of the Modulation Bandwidth<br>AS/NZS 4268 8.4<br>ETSI EN 300 330-1 7.3                                                                                                                                                                                                                                        | AS/NZS: The fundamental emissions must remain within the band from 70 kHz to 160 kHz in Australia and between 30 kHz and 190 kHz in New Zealand.<br>ETSI: The fundamental emissions must remain within the assigned frequency band.                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Pass |
| <b>CENELEC EN 55022:1998</b><br><b>ETSI EN 301 489-1 V1.6.1 (2005-09)</b><br><b>ETSI EN 301 489-3 V1.4.1 (2002-08)</b><br><b>Emissions</b>                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |
| Radiated Emissions                                                                                                                                                                                                                                                                                                                                              | Emissions below specified limits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Pass |
| <b>CENELEC EN 55024:1998</b><br><b>ETSI EN 301 489-1 V1.6.1 (2005-09)</b><br><b>ETSI EN 301 489-3 V1.4.1 (2002-08) Immunity</b>                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |
| EN 61000-4-2:1995<br>Electrostatic Discharge (ESD)                                                                                                                                                                                                                                                                                                              | ±4kV Contact discharge and<br>±8kV Air discharge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Pass |
| EN 61000-4-3:1996<br>Electromagnetic Field Immunity                                                                                                                                                                                                                                                                                                             | 80-1000MHz & 1400-2000MHz @ 3V/m at<br>1kHz 80% AM modulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Pass |
| EN 61000-4-8:1993<br>Magnetic Fields                                                                                                                                                                                                                                                                                                                            | 1 A/m @ 50 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Pass |

Notes: The EUT transmits at 137.5 and 141.0 kHz. The EUT is Product Class 4, Power Class 4.

REVISION SUMMARY – The following changes have been made to this Report:

| <u>Date</u> | <u>Project<br/>No.</u> | <u>Project<br/>Handler</u> | <u>Page(s)</u> | <u>Item</u>             | <u>Description of Change</u>                                                   |
|-------------|------------------------|----------------------------|----------------|-------------------------|--------------------------------------------------------------------------------|
| 10-17-2006  | 3104393                | Nicholas<br>Abbondante     | 28-29          | ESD                     | Updated report with recent test results for ESD                                |
| 10-17-2006  | 3104393                | Nicholas<br>Abbondante     | 31-32          | Radiated RF<br>Immunity | Updated report with recent test results for radiated<br>RF immunity            |
| 10-17-2006  | 3104393                | Nicholas<br>Abbondante     | 2, 10-17       | Radiated <30<br>MHz     | Updated report with recent test results for radiated<br>emissions below 30 MHz |

### 3.0 Sample Calculations

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB $\mu$ V/m
- RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

RA = 52.0 dB $\mu$ V  
 AF = 7.4 dB/m  
 CF = 1.6 dB  
 AG = 29.0 dB  
 FS = 32 dB $\mu$ V/m

$$\text{Level in } \mu\text{V/m} = [10(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

The following is how net line-conducted readings were determined:

$$NF = RF + LF + CF + AF$$

Where

- NF = Net Reading in dB $\mu$ V
- RF = Reading from receiver in dB $\mu$ V
- LF = LISN Correction Factor in dB
- CF = Cable Correction Factor in dB
- AF = Attenuator Loss Factor in dB

To convert from dB $\mu$ V to  $\mu$ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where UF = Net Reading in } \mu\text{V}$$

#### Example:

$$NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 \text{ dB}\mu\text{V}$$

$$UF = 10^{(49.1 \text{ dB}\mu\text{V} / 20)} = 254 \mu\text{V/m}$$

### 3.1 Measurement Uncertainty

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes.

The expanded uncertainty ( $k = 2$ ) for radiated emissions from 30 to 1000 MHz has been determined to be:  
 $\pm 3.5$  dB at 10m,  $\pm 3.8$  dB at 3m

The expanded uncertainty ( $k = 2$ ) for mains conducted emissions from 150 kHz to 30 MHz has been determined to be:

$\pm 2.6$  dB

The expanded uncertainty ( $k = 2$ ) for telecom port conducted emissions from 150 kHz to 30 MHz has been determined to be:

$\pm 3.2$  for ISN and voltage probe measurements

$\pm 3.1$  for current probe measurements

### 3.2 Site Description

**Test Site(s):** 2 and EMC and parking lot in front of Site 2

Our OATS are 3m and 10m sheltered emissions measurement ranges located in a light commercial environment in Boxborough, Massachusetts. They meet the technical requirements of ANSI C63.4-2003 and CISPR 22:1993/EN 55022:1994 for radiated and conducted emission measurements. The shelter structure is entirely fiberglass and plastic, with outside dimensions of 33 ft x 57 ft. The structure resembles a quonset hut with a center ceiling height of 16.5 ft.

The testing floor is covered by a galvanized sheet metal groundplane that is earth-grounded via copper rods around the perimeter of the site. The joints between individual metal sheets are bridged with a 2 inch wide metal strips to provide low RF impedance contact throughout. The sheets are screwed in place with stainless steel, round-head screws every three inches. Site illumination and HVAC are provided from beneath the ground reference plane through flush entry ports, the port covers are electrically bonded to the ground plane.

A flush metal turntable with 12 ft. diameter and 5000 lb. load capacity (12,000 lb. in Site 3) is provided for floor-standing equipment. A wooden table 80 cm high is used for table-top equipment. The turntable is electrically connected to the ground plane with three copper straps. The straps are connected to the turntable at the center of it with ground braid. The copper strap is directly connected to the groundplane at the edges of the turntable. The turntable is located on the south end of the structure and the antennas are mounted 3 and 10 meters away to the north. The antenna mast is a non-conductive with remote control of antenna height and polarization. The antenna height is adjustable from 1 to 4 meters.

All final radiated emission measurements are performed with the testing personnel and measurement equipment located below the ground reference plane. The site has a full basement underneath the turntable where support equipment may be remotely located. Operation of the antenna, turntable and equipment under test is controlled by remote controls that manipulate the antenna height and polarization and with a turntable control. Test personnel are located below the ellipse when measurements are performed, however the site maintains the ability of having personnel manipulate cables while monitoring test equipment. Ambient radiated emissions are 6 dB or more below the relevant FCC emission limits.

AC mains power is brought to the equipment under test through a power line filter, to remove ambient conducted noise. 50 Hz (240 VAC single phase), 60 Hz power (120 VAC single phase, 208 VAC three phase), and 60 Hz (480 VAC three phase) are available. Conducted emission measurements are performed with a Line Impedance Stabilization Network (LISN) or Artificial Mains Network (AMN) bonded to the ground reference plane. A removable vertical groundplane (2 meter X 2 meter area) is used for line-conducted measurements for table top equipment. The vertical groundplane is electrically connected to the reference groundplane.

The EMC Lab has two Semi-anechoic Chambers and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference groundplanes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

**Test Results:** Pass

**Test Standard:** AS/NZS 4268 5.4, 8.2, ETSI EN 300 330-1 7.2, 7.4, ERC/REC 70-03 Annex 9, FCC 15.205, 15.209, IC RSS-210 2.7

**Test:** RF Output Power and Spurious Emissions Below 30 MHz

**Performance Criterion:**

AS/NZS: The fundamental field strength must not exceed 3 uW (18.5 dBuA/m at 3m) in Australia and 10 mW in New Zealand. The spurious emissions must not exceed 0.1 uW (-40 dBm) in Australia and 2.25 uW in New Zealand.

ETSI: The fundamental field strength at 137.5 kHz must not exceed 73.4 dBuA/m (ERC/REC 70-03) or 46.6 dBuA/m and the fundamental field strength at 141 kHz must not exceed 69.1 dBuA/m (ERC/REC 70-03) or 46.5 dBuA/m at 3 meters. The field strength of spurious emissions must not exceed 27 dBuA/m at 9 kHz descending 3 dB/Octave at 10 meters.

FCC: Emissions must be below the 15.209 limits.

IC: Emissions must be below the RSS-210 2.7 Table 3 limits.

**Test Environment:**

|                                          |               |           |                       |           |               |           |
|------------------------------------------|---------------|-----------|-----------------------|-----------|---------------|-----------|
| Environmental Conditions During Testing: | Humidity (%): | See Table | Pressure (hPa):       | See Table | Ambient (°C): | See Table |
| Pretest Verification Performed           | Yes           |           | Equipment under Test: |           | M640          |           |

**Test Equipment Used:**

| TEST EQUIPMENT LIST |                                   |         |           |            |               |
|---------------------|-----------------------------------|---------|-----------|------------|---------------|
| Item                | Equipment Type                    | Make    | Model No. | Serial No. | Next Cal. Due |
| 1                   | LOOP ANTENNA                      | Empire  | LG-105    | 61         | 05/10/2007    |
| 2                   | ANTENNA, LOOP, 150 kHz - 30 MHz   | Empire  | LP-105A   | 127        | 08/30/2007    |
| 3                   | Digital 4 Line Barometer          | Mannix  | 0ABA116   | BAR2       | 08/02/2007    |
| 4                   | ANTENNA                           | EMCO    | 3142      | 9701-1116  | 11/10/2006    |
| 5                   | Cable, BNC - BNC, 15' long        | Belden  | RG-58/U   | CBL022     | 01/03/2007    |
| 6                   | 3 Meter In floor cable for site 2 | ITS     | RG214B/U  | S2 3M FLR  | 09/26/2007    |
| 7                   | Spectrum Analyzer                 | Agilent | E7405A    | US40240205 | 08/16/2007    |

**Software Utilized:**

| Name           | Manufacturer          | Version          |
|----------------|-----------------------|------------------|
| EXCEL 2000     | Microsoft Corporation | 9.0.6926 SP-3    |
| EMI BOXBOROUGH | Intertek              | 1/17/06 Revision |

## Test Details:

### Special Radiated Emissions

Company: Timex Corporation  
 Model #: M640  
 Serial #: 6  
 Engineers: Nicholas Abbondante  
 Project #: 3104393  
 Standard: FCC Part 15 Subpart C 15.209, IC RSS-210  
 Receiver: Agilent E7405A (AGL001)  
 PreAmp: NONE.  
 Barometer: BAR2  
 Temp/Humidity/Pressure: 18c 51% 1012mB  
 Antenna & Cables: LF Bands: N, LF, HF, SHF  
 LF Antenna: Loop1 05-10-07 1m E.ant Loop1 05-10-07 1m H.ant  
 N Antenna: LOG1 11-10-06 V3.ant LOG1 11-10-06 H3.ant  
 HF Antenna: EMP2 08-30-07 1m E.ANT EMP2 08-30-07 1m H.ANT  
 SHF Antenna: NONE.  
 LF Cable(s): CBL022 1-03-07.cbl NONE.  
 N Cable(s): S2 3M FLR 9-26-07.txt NONE.  
 HF Cable(s): CBL022 1-03-07.cbl NONE.  
 SHF Cable(s): CBL030 12-12-2006.txt NONE.  
 Location: Site 2  
 Date(s): 10/17/06  
 Limit Distance (m): 3  
 Test Distance (m): 3  
 Voltage/Frequency: Fresh 3V Battery  
 Frequency Range: 9 kHz - 150 kHz  
 PreAmp Used? (Y or N): N  
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

| Detector Type | Ant. Pol. (V/H) | Frequency MHz | Reading dB(uV) | Antenna Factor dB(1/m) | Cable Loss dB | Pre-amp Factor dB | Distance Factor dB | Net dB(uV/m) | Limit dB(uV/m) | Margin dB | Bandwidth  |
|---------------|-----------------|---------------|----------------|------------------------|---------------|-------------------|--------------------|--------------|----------------|-----------|------------|
| PK            | V               | 0.138         | 22.3           | 49.1                   | 0.0           | 0.0               | 0.0                | 71.3         | 104.8          | -33.5     | 200/300 Hz |
| PK            | V               | 0.141         | 24.7           | 49.1                   | 0.0           | 0.0               | 0.0                | 73.8         | 104.6          | -30.8     | 200/300 Hz |
| QP            | V               | 0.138         | 7.6            | 49.1                   | 0.0           | 0.0               | 0.0                | 56.7         | 104.8          | -48.2     | 200/300 Hz |
| QP            | V               | 0.141         | 4.4            | 49.1                   | 0.0           | 0.0               | 0.0                | 53.5         | 104.6          | -51.1     | 200/300 Hz |
| AVG           | V               | 0.138         | -1.8           | 49.1                   | 0.0           | 0.0               | 0.0                | 47.3         | 104.8          | -57.5     | 200/300 Hz |
| AVG           | V               | 0.141         | -5.4           | 49.1                   | 0.0           | 0.0               | 0.0                | 43.7         | 104.6          | -60.9     | 200/300 Hz |

Notes: The limits were extrapolated to 3 meters using a 40 dB/decade scaling factor.

### Special Radiated Emissions

Company: Timex Corporation  
 Model #: M640  
 Serial #: 6  
 Engineers: Nicholas Abbondante  
 Project #: 3104393  
 Standard: ETSI EN 300 330  
 Receiver: Agilent E7405A (AGL001)  
 PreAmp: NONE.  
 Barometer: BAR2  
 Temp/Humidity/Pressure: 18c 51% 1012mB  
 Antenna & Cables: LF Bands: N, LF, HF, SHF  
 LF Antenna: Loop1 05-10-07 1m E.ant Loop1 05-10-07 1m H.ant  
 N Antenna: LOG1 11-10-06 V3.ant LOG1 11-10-06 H3.ant  
 HF Antenna: EMP2 08-30-07 1m E.ANT EMP2 08-30-07 1m H.ANT  
 SHF Antenna: NONE.  
 LF Cable(s): CBL022 1-03-07.cbl NONE.  
 N Cable(s): S2 3M FLR 9-26-07.txt NONE.  
 HF Cable(s): CBL022 1-03-07.cbl NONE.  
 SHF Cable(s): CBL030 12-12-2006.txt NONE.  
 Location: Site 2  
 Date(s): 10/17/06  
 Limit Distance (m): 3  
 Test Distance (m): 3  
 Voltage/Frequency: Fresh 3V Battery  
 Frequency Range: 9 kHz - 150 kHz  
 PreAmp Used? (Y or N): N  
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

| Detector Type | Ant. Pol. (V/H) | Frequency MHz | Reading dB(uV) | Antenna Factor dB(1/m) | Cable Loss dB | Pre-amp Factor dB | Distance Factor dB | Net dB(uA/m) | Limit dB(uA/m) | Margin dB | Bandwidth  |
|---------------|-----------------|---------------|----------------|------------------------|---------------|-------------------|--------------------|--------------|----------------|-----------|------------|
| PK            | V               | 0.138         | 22.3           | 49.1                   | 0.0           | 0.0               | 0.0                | 20.8         | 46.6           | -25.8     | 200/300 Hz |
| PK            | V               | 0.141         | 24.7           | 49.1                   | 0.0           | 0.0               | 0.0                | 23.3         | 46.5           | -23.2     | 200/300 Hz |
| QP            | V               | 0.138         | 7.6            | 49.1                   | 0.0           | 0.0               | 0.0                | 6.2          | 46.6           | -40.4     | 200/300 Hz |
| QP            | V               | 0.141         | 4.4            | 49.1                   | 0.0           | 0.0               | 0.0                | 3.0          | 46.5           | -43.5     | 200/300 Hz |
| AVG           | V               | 0.138         | -1.8           | 49.1                   | 0.0           | 0.0               | 0.0                | -3.2         | 46.6           | -49.8     | 200/300 Hz |
| AVG           | V               | 0.141         | -5.4           | 49.1                   | 0.0           | 0.0               | 0.0                | -6.8         | 46.5           | -53.3     | 200/300 Hz |

Notes: A 51.5 dB factor was used to convert readings from dBuV/m to dBuA/m. The limits were extrapolated to a 3 meter test distance using the methods of ETSI EN 300 330-1 Annex J.

### Special Radiated Emissions

Company: Timex Corporation  
 Model #: M640  
 Serial #: 6  
 Engineers: Nicholas Abbondante  
 Project #: 3104393  
 Standard: AS/NZS 4268  
 Receiver: Agilent E7405A (AGL001)  
 PreAmp: NONE.  
 Barometer: BAR2  
 Temp/Humidity/Pressure: 18c 51% 1012mB  
 PreAmp Used? (Y or N): N  
 Voltage/Frequency: Fresh 3V Battery  
 Frequency Range: 9 kHz - 150 kHz  
 Location: Site 2  
 Date(s): 10/17/06  
 Limit Distance (m): 3  
 Test Distance (m): 3  
 Antenna & Cables: LF Bands: N, LF, HF, SHF  
 LF Antenna: Loop1 05-10-07 1m E.ant Loop1 05-10-07 1m H.ant  
 N Antenna: LOG1 11-10-06 V3.ant LOG1 11-10-06 H3.ant  
 HF Antenna: EMP2 08-30-07 1m E.ANT EMP2 08-30-07 1m H.ANT  
 SHF Antenna: NONE.  
 LF Cable(s): CBL022 1-03-07.cbl NONE.  
 N Cable(s): S2 3M FLR 9-26-07.txt NONE.  
 HF Cable(s): CBL022 1-03-07.cbl NONE.  
 SHF Cable(s): CBL030 12-12-2006.txt NONE.  
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

| Detector Type | Ant. Pol. (V/H) | Frequency MHz | Reading dB(uV) | Antenna Factor dB(Ω/m) | Cable Loss dB | Pre-amp Factor dB | Distance Factor dB | Net dB(uA/m) | Limit dB(uA/m) | Margin dB | Bandwidth  |
|---------------|-----------------|---------------|----------------|------------------------|---------------|-------------------|--------------------|--------------|----------------|-----------|------------|
| QP            | H               | 0.138         | 7.6            | -2.4                   | 0.0           | 0.0               | 0.0                | 5.2          | 18.5           | -13.3     | 200/300 Hz |
| QP            | H               | 0.141         | 4.4            | -2.4                   | 0.0           | 0.0               | 0.0                | 2.0          | 18.5           | -16.5     | 200/300 Hz |

Notes: The limits were extrapolated to a 3 meter test distance using the methods of AS/NZS 4268 5.4.

## Special Radiated Emissions

Company: Timex Corporation  
 Model #: M640  
 Serial #: 6  
 Engineers: Nicholas Abbondante  
 Project #: 3104393 Date(s): 10/17/06 Location: Site 2  
 Standard: FCC Part 15 Subpart C 15.209, IC RSS-210  
 Receiver: Agilent E7405A (AGL001) Limit Distance (m): 3  
 PreAmp: NONE Test Distance (m): 3  
 Barometer: BAR2 Temp/Humidity/Pressure: 18c 51% 1012mB  
 PreAmp Used? (Y or N): N Voltage/Frequency: Fresh 3V Battery Frequency Range: 150 kHz - 30 MHz  
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Antenna & Cables: HF Bands: N, LF, HF, SHF  
 LF Antenna: Loop1 05-10-07 1m E.ant Loop1 05-10-07 1m H.ant  
 N Antenna: LOG1 11-10-06 V3.ant LOG1 11-10-06 H3.ant  
 HF Antenna: EMP2 08-30-07 1m E.ANT EMP2 08-30-07 1m H.ANT  
 SHF Antenna: NONE NONE  
 LF Cable(s): CBL022 1-03-07.cbl NONE  
 N Cable(s): S2 3M FLR 9-26-07.txt NONE  
 HF Cable(s): CBL022 1-03-07.cbl NONE  
 SHF Cable(s): CBL030 12-12-2006.txt NONE

| Detector Type | Ant. Pol. (V/H) | Frequency MHz | Reading dB(uV) | Antenna Factor dB(1/m) | Cable Loss dB | Pre-amp Factor dB | Distance Factor dB | Net dB(uV/m) | Limit dB(uV/m) | Margin dB | Bandwidth |
|---------------|-----------------|---------------|----------------|------------------------|---------------|-------------------|--------------------|--------------|----------------|-----------|-----------|
| QP            | V               | 0.275         | -13.3          | 59.5                   | 0.0           | 0.0               | 0.0                | 46.2         | 98.8           | -52.7     | 9/30 kHz  |
| QP            | V               | 0.282         | -13.8          | 59.4                   | 0.0           | 0.0               | 0.0                | 45.7         | 98.6           | -52.9     | 9/30 kHz  |
| QP            | V               | 0.413         | -17.8          | 56.8                   | 0.1           | 0.0               | 0.0                | 39.1         | 95.3           | -56.2     | 9/30 kHz  |
| QP            | V               | 0.423         | -12.9          | 56.8                   | 0.1           | 0.0               | 0.0                | 44.0         | 95.1           | -51.1     | 9/30 kHz  |
| QP            | V               | 0.550         | -4.5           | 56.1                   | 0.1           | 0.0               | 0.0                | 51.7         | 72.8           | -21.1     | 9/30 kHz  |
| QP            | V               | 0.564         | -10.2          | 56.0                   | 0.1           | 0.0               | 0.0                | 45.9         | 72.6           | -26.6     | 9/30 kHz  |
| QP            | V               | 0.705         | -15.3          | 55.7                   | 0.1           | 0.0               | 0.0                | 40.5         | 70.6           | -30.2     | 9/30 kHz  |
| QP            | V               | 0.846         | -1.9           | 55.4                   | 0.1           | 0.0               | 0.0                | 53.6         | 69.1           | -15.4     | 9/30 kHz  |
| QP            | V               | 0.963         | -6.2           | 54.2                   | 0.1           | 0.0               | 0.0                | 48.0         | 67.9           | -19.9     | 9/30 kHz  |
| QP            | V               | 0.987         | -3.8           | 54.1                   | 0.1           | 0.0               | 0.0                | 50.4         | 67.7           | -17.3     | 9/30 kHz  |
| QP            | V               | 1.100         | -14.2          | 53.9                   | 0.1           | 0.0               | 0.0                | 39.9         | 66.8           | -26.9     | 9/30 kHz  |
| QP            | V               | 1.128         | -3.2           | 53.9                   | 0.1           | 0.0               | 0.0                | 50.8         | 66.6           | -15.7     | 9/30 kHz  |
| QP            | V               | 1.238         | -9.0           | 53.7                   | 0.1           | 0.0               | 0.0                | 44.9         | 65.8           | -20.9     | 9/30 kHz  |
| QP            | V               | 1.269         | -11.3          | 53.7                   | 0.1           | 0.0               | 0.0                | 42.5         | 65.5           | -23.0     | 9/30 kHz  |
| QP            | V               | 1.375         | -5.8           | 53.5                   | 0.1           | 0.0               | 0.0                | 47.9         | 64.8           | -17.0     | 9/30 kHz  |
| QP            | V               | 1.410         | -11.8          | 53.4                   | 0.1           | 0.0               | 0.0                | 41.8         | 64.6           | -22.9     | 9/30 kHz  |
| QP            | V               | 1.513         | -3.6           | 53.3                   | 0.2           | 0.0               | 0.0                | 49.9         | 64.0           | -14.1     | 9/30 kHz  |
| QP            | V               | 1.650         | -17.8          | 53.1                   | 0.2           | 0.0               | 0.0                | 35.4         | 63.3           | -27.8     | 9/30 kHz  |
| QP            | V               | 1.692         | -17.7          | 53.0                   | 0.2           | 0.0               | 0.0                | 35.5         | 63.0           | -27.6     | 9/30 kHz  |
| QP            | V               | 1.788         | -17.8          | 52.9                   | 0.2           | 0.0               | 0.0                | 35.2         | 69.5           | -34.3     | 9/30 kHz  |
| QP            | V               | 1.833         | -17.7          | 52.8                   | 0.2           | 0.0               | 0.0                | 35.3         | 69.5           | -34.2     | 9/30 kHz  |
| QP            | V               | 1.925         | -17.6          | 52.7                   | 0.2           | 0.0               | 0.0                | 35.3         | 69.5           | -34.2     | 9/30 kHz  |
| QP            | V               | 1.974         | -17.5          | 52.6                   | 0.2           | 0.0               | 0.0                | 35.3         | 69.5           | -34.2     | 9/30 kHz  |
| QP            | V               | 2.200         | -15.6          | 51.5                   | 0.2           | 0.0               | 0.0                | 36.2         | 69.5           | -33.3     | 9/30 kHz  |
| QP            | V               | 2.256         | -17.9          | 51.4                   | 0.2           | 0.0               | 0.0                | 33.7         | 69.5           | -35.8     | 9/30 kHz  |
| QP            | V               | 2.338         | -18.1          | 51.3                   | 0.2           | 0.0               | 0.0                | 33.4         | 69.5           | -36.1     | 9/30 kHz  |
| QP            | V               | 2.397         | -18.0          | 51.2                   | 0.2           | 0.0               | 0.0                | 33.4         | 69.5           | -36.1     | 9/30 kHz  |
| QP            | V               | 2.475         | -18.3          | 51.0                   | 0.2           | 0.0               | 0.0                | 33.0         | 69.5           | -36.5     | 9/30 kHz  |
| QP            | V               | 2.538         | -18.2          | 50.9                   | 0.2           | 0.0               | 0.0                | 32.9         | 69.5           | -36.6     | 9/30 kHz  |
| QP            | V               | 2.613         | -18.1          | 50.8                   | 0.2           | 0.0               | 0.0                | 32.9         | 69.5           | -36.6     | 9/30 kHz  |
| QP            | V               | 2.679         | -18.0          | 50.6                   | 0.2           | 0.0               | 0.0                | 32.8         | 69.5           | -36.7     | 9/30 kHz  |
| QP            | V               | 2.750         | -18.0          | 50.5                   | 0.2           | 0.0               | 0.0                | 32.8         | 69.5           | -36.8     | 9/30 kHz  |
| QP            | V               | 2.820         | -17.9          | 50.4                   | 0.2           | 0.0               | 0.0                | 32.7         | 69.5           | -36.8     | 9/30 kHz  |
| QP            | V               | 2.888         | -17.7          | 50.2                   | 0.2           | 0.0               | 0.0                | 32.7         | 69.5           | -36.8     | 9/30 kHz  |
| QP            | V               | 2.961         | -17.7          | 50.1                   | 0.2           | 0.0               | 0.0                | 32.6         | 69.5           | -36.9     | 9/30 kHz  |
| QP            | V               | 3.025         | -17.5          | 50.0                   | 0.2           | 0.0               | 0.0                | 32.7         | 69.5           | -36.8     | 9/30 kHz  |
| QP            | V               | 3.102         | -17.4          | 49.8                   | 0.2           | 0.0               | 0.0                | 32.6         | 69.5           | -36.9     | 9/30 kHz  |
| QP            | V               | 3.163         | -17.5          | 49.7                   | 0.2           | 0.0               | 0.0                | 32.4         | 69.5           | -37.1     | 9/30 kHz  |
| QP            | V               | 3.243         | -17.2          | 49.6                   | 0.2           | 0.0               | 0.0                | 32.6         | 69.5           | -36.9     | 9/30 kHz  |
| QP            | V               | 3.300         | -17.2          | 49.5                   | 0.2           | 0.0               | 0.0                | 32.5         | 69.5           | -37.0     | 9/30 kHz  |
| QP            | V               | 3.384         | -17.2          | 49.3                   | 0.2           | 0.0               | 0.0                | 32.3         | 69.5           | -37.2     | 9/30 kHz  |
| QP            | V               | 3.438         | -17.0          | 49.2                   | 0.2           | 0.0               | 0.0                | 32.4         | 69.5           | -37.1     | 9/30 kHz  |
| QP            | V               | 3.525         | -16.9          | 49.0                   | 0.2           | 0.0               | 0.0                | 32.3         | 69.5           | -37.2     | 9/30 kHz  |

FCC IC

RB

Notes: The limits are extrapolated to 3 meters using a 40 dB/decade scaling factor.

## Special Radiated Emissions

Company: Timex Corporation  
 Model #: M640  
 Serial #: 6  
 Engineers: Nicholas Abbondante  
 Project #: 3104393  
 Standard: ETSI EN 300 330  
 Receiver: Agilent E7405A (AGL001)  
 PreAmp: NONE  
 Barometer: BAR2  
 Temp/Humidity/Pressure: 18c 51% 1012mB  
 Antenna & Cables: HF Bands: N, LF, HF, SHF  
 LF Antenna: Loop1 05-10-07 1m E.ant Loop1 05-10-07 1m H.ant  
 N Antenna: LOG1 11-10-06 V3.ant LOG1 11-10-06 H3.ant  
 HF Antenna: EMP2 08-30-07 1m E.ANT EMP2 08-30-07 1m H.ANT  
 SHF Antenna: NONE.  
 LF Cable(s): CBL022 1-03-07.cbl  
 N Cable(s): S2 3M FLR 9-26-07.txt  
 HF Cable(s): CBL022 1-03-07.cbl  
 SHF Cable(s): CBL030 12-12-2006.txt  
 Location: Site 2  
 Date(s): 10/17/06  
 Limit Distance (m): 3  
 Test Distance (m): 3  
 PreAmp Used? (Y or N): N  
 Voltage/Frequency: Fresh 3V Battery  
 Frequency Range: 150 kHz - 30 MHz  
 Peak: PK Quasi-Peak: QP Average: AVG  
 RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

| Detector Type | Ant. Pol. (V/H) | Frequency MHz | Reading dB(uV) | Antenna Factor dB(1/m) | Cable Loss dB | Pre-amp Factor dB | Distance Factor dB | Net dB(uA/m) | Limit dB(uA/m) | Margin dB | Bandwidth |
|---------------|-----------------|---------------|----------------|------------------------|---------------|-------------------|--------------------|--------------|----------------|-----------|-----------|
| QP            | V               | 0.275         | -13.3          | 59.5                   | 0.0           | 0.0               | 0.0                | -4.3         | 43.6           | -47.9     | 9/30 kHz  |
| QP            | V               | 0.282         | -13.8          | 59.4                   | 0.0           | 0.0               | 0.0                | -4.8         | 43.5           | -48.3     | 9/30 kHz  |
| QP            | V               | 0.413         | -17.8          | 56.8                   | 0.1           | 0.0               | 0.0                | -11.4        | 41.8           | -53.2     | 9/30 kHz  |
| QP            | V               | 0.423         | -12.9          | 56.8                   | 0.1           | 0.0               | 0.0                | -6.5         | 41.7           | -48.2     | 9/30 kHz  |
| QP            | V               | 0.550         | -4.5           | 56.1                   | 0.1           | 0.0               | 0.0                | 1.2          | 40.6           | -39.3     | 9/30 kHz  |
| QP            | V               | 0.564         | -10.2          | 56.0                   | 0.1           | 0.0               | 0.0                | -4.6         | 40.5           | -45.0     | 9/30 kHz  |
| QP            | V               | 0.705         | -15.3          | 55.7                   | 0.1           | 0.0               | 0.0                | -10.0        | 39.5           | -49.5     | 9/30 kHz  |
| QP            | V               | 0.846         | -1.9           | 55.4                   | 0.1           | 0.0               | 0.0                | 3.1          | 38.7           | -35.6     | 9/30 kHz  |
| QP            | V               | 0.963         | -6.2           | 54.2                   | 0.1           | 0.0               | 0.0                | -2.5         | 38.2           | -40.6     | 9/30 kHz  |
| QP            | V               | 0.987         | -3.8           | 54.1                   | 0.1           | 0.0               | 0.0                | -0.1         | 38.0           | -38.1     | 9/30 kHz  |
| QP            | V               | 1.100         | -14.2          | 53.9                   | 0.1           | 0.0               | 0.0                | -10.7        | 37.6           | -48.2     | 9/30 kHz  |
| QP            | V               | 1.128         | -3.2           | 53.9                   | 0.1           | 0.0               | 0.0                | 0.3          | 37.5           | -37.1     | 9/30 kHz  |
| QP            | V               | 1.238         | -9.0           | 53.7                   | 0.1           | 0.0               | 0.0                | -5.6         | 37.1           | -42.7     | 9/30 kHz  |
| QP            | V               | 1.269         | -11.3          | 53.7                   | 0.1           | 0.0               | 0.0                | -8.0         | 37.0           | -44.9     | 9/30 kHz  |
| QP            | V               | 1.375         | -5.8           | 53.5                   | 0.1           | 0.0               | 0.0                | -2.6         | 36.6           | -39.2     | 9/30 kHz  |
| QP            | V               | 1.410         | -11.8          | 53.4                   | 0.1           | 0.0               | 0.0                | -8.7         | 36.5           | -45.2     | 9/30 kHz  |
| QP            | V               | 1.513         | -3.6           | 53.3                   | 0.2           | 0.0               | 0.0                | -0.6         | 36.2           | -36.8     | 9/30 kHz  |
| QP            | V               | 1.650         | -17.8          | 53.1                   | 0.2           | 0.0               | 0.0                | -15.1        | 58.3           | -73.4     | 9/30 kHz  |
| QP            | V               | 1.692         | -17.7          | 53.0                   | 0.2           | 0.0               | 0.0                | -15.0        | 58.0           | -73.1     | 9/30 kHz  |
| QP            | V               | 1.788         | -17.8          | 52.9                   | 0.2           | 0.0               | 0.0                | -15.3        | 57.5           | -72.8     | 9/30 kHz  |
| QP            | V               | 1.833         | -17.7          | 52.8                   | 0.2           | 0.0               | 0.0                | -15.2        | 57.3           | -72.5     | 9/30 kHz  |
| QP            | V               | 1.925         | -17.6          | 52.7                   | 0.2           | 0.0               | 0.0                | -15.2        | 56.8           | -72.0     | 9/30 kHz  |
| QP            | V               | 1.974         | -17.5          | 52.6                   | 0.2           | 0.0               | 0.0                | -15.2        | 56.5           | -71.7     | 9/30 kHz  |
| QP            | V               | 2.200         | -15.6          | 51.5                   | 0.2           | 0.0               | 0.0                | -14.3        | 55.4           | -69.7     | 9/30 kHz  |
| QP            | V               | 2.256         | -17.9          | 51.4                   | 0.2           | 0.0               | 0.0                | -16.8        | 55.2           | -72.0     | 9/30 kHz  |
| QP            | V               | 2.338         | -18.1          | 51.3                   | 0.2           | 0.0               | 0.0                | -17.1        | 54.8           | -71.8     | 9/30 kHz  |
| QP            | V               | 2.397         | -18.0          | 51.2                   | 0.2           | 0.0               | 0.0                | -17.1        | 54.5           | -71.6     | 9/30 kHz  |
| QP            | V               | 2.475         | -18.3          | 51.0                   | 0.2           | 0.0               | 0.0                | -17.5        | 54.2           | -71.7     | 9/30 kHz  |
| QP            | V               | 2.538         | -18.2          | 50.9                   | 0.2           | 0.0               | 0.0                | -17.6        | 53.9           | -71.4     | 9/30 kHz  |
| QP            | V               | 2.613         | -18.1          | 50.8                   | 0.2           | 0.0               | 0.0                | -17.6        | 53.6           | -71.1     | 9/30 kHz  |
| QP            | V               | 2.679         | -18.0          | 50.6                   | 0.2           | 0.0               | 0.0                | -17.7        | 53.3           | -70.9     | 9/30 kHz  |
| QP            | V               | 2.750         | -18.0          | 50.5                   | 0.2           | 0.0               | 0.0                | -17.8        | 53.0           | -70.7     | 9/30 kHz  |
| QP            | V               | 2.820         | -17.9          | 50.4                   | 0.2           | 0.0               | 0.0                | -17.8        | 52.7           | -70.5     | 9/30 kHz  |
| QP            | V               | 2.888         | -17.7          | 50.2                   | 0.2           | 0.0               | 0.0                | -17.8        | 52.4           | -70.2     | 9/30 kHz  |
| QP            | V               | 2.961         | -17.7          | 50.1                   | 0.2           | 0.0               | 0.0                | -17.9        | 52.1           | -70.0     | 9/30 kHz  |
| QP            | V               | 3.025         | -17.5          | 50.0                   | 0.2           | 0.0               | 0.0                | -17.8        | 51.8           | -69.7     | 9/30 kHz  |
| QP            | V               | 3.102         | -17.4          | 49.8                   | 0.2           | 0.0               | 0.0                | -17.9        | 51.6           | -69.4     | 9/30 kHz  |
| QP            | V               | 3.163         | -17.5          | 49.7                   | 0.2           | 0.0               | 0.0                | -18.1        | 51.3           | -69.4     | 9/30 kHz  |
| QP            | V               | 3.243         | -17.2          | 49.6                   | 0.2           | 0.0               | 0.0                | -17.9        | 51.0           | -68.9     | 9/30 kHz  |
| QP            | V               | 3.300         | -17.2          | 49.5                   | 0.2           | 0.0               | 0.0                | -18.0        | 50.8           | -68.8     | 9/30 kHz  |
| QP            | V               | 3.384         | -17.2          | 49.3                   | 0.2           | 0.0               | 0.0                | -18.2        | 50.5           | -68.6     | 9/30 kHz  |
| QP            | V               | 3.438         | -17.0          | 49.2                   | 0.2           | 0.0               | 0.0                | -18.1        | 50.3           | -68.3     | 9/30 kHz  |
| QP            | V               | 3.525         | -16.9          | 49.0                   | 0.2           | 0.0               | 0.0                | -18.2        | 50.0           | -68.1     | 9/30 kHz  |

Notes: A 51.5 dB factor was used to convert readings from dBuV/m to dBuA/m. The limits were extrapolated to a 3 meter test distance using the methods of ETSI EN 300 330-1 Annex J.

## Special Radiated Emissions

Company: Timex Corporation

Model #: M640

Serial #: 6

Engineers: Nicholas Abbondante

Location: Site 2

Project #: 3104393

Date(s): 10/17/06

Standard: AS/NZS 4268

Receiver: Agilent E7405A (AGL001)

Limit Distance (m): 3

PreAmp: NONE.

Test Distance (m): 3

Barometer: BAR2 Temp/Humidity/Pressure: 18c 51% 1012mB

Antenna & Cables: HF Bands: N, LF, HF, SHF

LF Antenna: Loop1 05-10-07 1m E.ant Loop1 05-10-07 1m H.ant

N Antenna: LOG1 11-10-06 V3.ant LOG1 11-10-06 H3.ant

HF Antenna: EMP2 08-30-07 1m E.ANT EMP2 08-30-07 1m H.ANT

SHF Antenna: NONE.

NONE.

LF Cable(s): CBL022 1-03-07.cbl NONE.

N Cable(s): S2 3M FLR 9-26-07.txt NONE.

HF Cable(s): CBL022 1-03-07.cbl NONE.

SHF Cable(s): CBL030 12-12-2006.txt NONE.

PreAmp Used? (Y or N): N

Voltage/Frequency: Fresh 3V Battery

Frequency Range: 150 kHz - 30 MHz

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

| Detector Type | Ant. Pol. (V/H) | Frequency MHz | Reading dB(uV) | Antenna Factor dB(Ω/m) | Cable Loss dB | Pre-amp Factor dB | Distance Factor dB | Net dB(uA/m) | Limit dB(uA/m) | Margin dB | Bandwidth |
|---------------|-----------------|---------------|----------------|------------------------|---------------|-------------------|--------------------|--------------|----------------|-----------|-----------|
| QP            | H               | 0.275         | -13.3          | 8.0                    | 0.0           | 0.0               | 0.0                | -5.3         | 3.7            | -9.0      | 9/30 kHz  |
| QP            | H               | 0.282         | -13.8          | 7.9                    | 0.0           | 0.0               | 0.0                | -5.8         | 3.7            | -9.5      | 9/30 kHz  |
| QP            | H               | 0.413         | -17.8          | 5.3                    | 0.1           | 0.0               | 0.0                | -12.4        | 3.7            | -16.1     | 9/30 kHz  |
| QP            | H               | 0.423         | -12.9          | 5.3                    | 0.1           | 0.0               | 0.0                | -7.5         | 3.7            | -11.2     | 9/30 kHz  |
| QP            | H               | 0.550         | -4.5           | 4.6                    | 0.1           | 0.0               | 0.0                | 0.2          | 3.7            | -3.5      | 9/30 kHz  |
| QP            | H               | 0.564         | -10.2          | 4.5                    | 0.1           | 0.0               | 0.0                | -5.6         | 3.7            | -9.3      | 9/30 kHz  |
| QP            | H               | 0.705         | -15.3          | 4.2                    | 0.1           | 0.0               | 0.0                | -11.0        | 3.7            | -14.7     | 9/30 kHz  |
| QP            | H               | 0.846         | -1.9           | 3.9                    | 0.1           | 0.0               | 0.0                | 2.1          | 3.7            | -1.6      | 9/30 kHz  |
| QP            | H               | 0.963         | -6.2           | 2.7                    | 0.1           | 0.0               | 0.0                | -3.5         | 3.7            | -7.2      | 9/30 kHz  |
| QP            | H               | 0.987         | -3.8           | 2.6                    | 0.1           | 0.0               | 0.0                | -1.1         | 3.7            | -4.8      | 9/30 kHz  |
| QP            | H               | 1.100         | -14.2          | 2.4                    | 0.1           | 0.0               | 0.0                | -11.7        | 3.7            | -15.4     | 9/30 kHz  |
| QP            | H               | 1.128         | -3.2           | 2.4                    | 0.1           | 0.0               | 0.0                | -0.7         | 3.7            | -4.4      | 9/30 kHz  |
| QP            | H               | 1.238         | -9.0           | 2.2                    | 0.1           | 0.0               | 0.0                | -6.7         | 3.7            | -10.4     | 9/30 kHz  |
| QP            | H               | 1.269         | -11.3          | 2.1                    | 0.1           | 0.0               | 0.0                | -9.0         | 3.7            | -12.7     | 9/30 kHz  |
| QP            | H               | 1.375         | -5.8           | 1.9                    | 0.1           | 0.0               | 0.0                | -3.7         | 3.7            | -7.4      | 9/30 kHz  |
| QP            | H               | 1.410         | -11.8          | 1.9                    | 0.1           | 0.0               | 0.0                | -9.8         | 3.7            | -13.5     | 9/30 kHz  |
| QP            | H               | 1.513         | -3.6           | 1.7                    | 0.2           | 0.0               | 0.0                | -1.7         | 3.7            | -5.4      | 9/30 kHz  |
| QP            | H               | 1.650         | -17.8          | 1.5                    | 0.2           | 0.0               | 0.0                | -16.1        | 3.7            | -19.8     | 9/30 kHz  |
| QP            | H               | 1.692         | -17.7          | 1.4                    | 0.2           | 0.0               | 0.0                | -16.1        | 3.7            | -19.8     | 9/30 kHz  |
| QP            | H               | 1.788         | -17.8          | 1.3                    | 0.2           | 0.0               | 0.0                | -16.3        | 3.7            | -20.0     | 9/30 kHz  |
| QP            | H               | 1.833         | -17.7          | 1.3                    | 0.2           | 0.0               | 0.0                | -16.3        | 3.7            | -20.0     | 9/30 kHz  |
| QP            | H               | 1.925         | -17.6          | 1.1                    | 0.2           | 0.0               | 0.0                | -16.3        | 3.7            | -20.0     | 9/30 kHz  |
| QP            | H               | 1.974         | -17.5          | 1.1                    | 0.2           | 0.0               | 0.0                | -16.2        | 3.7            | -19.9     | 9/30 kHz  |
| QP            | H               | 2.200         | -15.6          | 0.0                    | 0.2           | 0.0               | 0.0                | -15.4        | 3.7            | -19.1     | 9/30 kHz  |
| QP            | H               | 2.256         | -17.9          | -0.1                   | 0.2           | 0.0               | 0.0                | -17.9        | 3.7            | -21.6     | 9/30 kHz  |
| QP            | H               | 2.338         | -18.1          | -0.3                   | 0.2           | 0.0               | 0.0                | -18.1        | 3.7            | -21.8     | 9/30 kHz  |
| QP            | H               | 2.397         | -18.0          | -0.4                   | 0.2           | 0.0               | 0.0                | -18.2        | 3.7            | -21.9     | 9/30 kHz  |
| QP            | H               | 2.475         | -18.3          | -0.6                   | 0.2           | 0.0               | 0.0                | -18.6        | 3.7            | -22.3     | 9/30 kHz  |
| QP            | H               | 2.538         | -18.2          | -0.7                   | 0.2           | 0.0               | 0.0                | -18.6        | 3.7            | -22.3     | 9/30 kHz  |
| QP            | H               | 2.613         | -18.1          | -0.8                   | 0.2           | 0.0               | 0.0                | -18.7        | 3.7            | -22.4     | 9/30 kHz  |
| QP            | H               | 2.679         | -18.0          | -0.9                   | 0.2           | 0.0               | 0.0                | -18.7        | 3.7            | -22.4     | 9/30 kHz  |
| QP            | H               | 2.750         | -18.0          | -1.1                   | 0.2           | 0.0               | 0.0                | -18.8        | 3.7            | -22.5     | 9/30 kHz  |
| QP            | H               | 2.820         | -17.9          | -1.2                   | 0.2           | 0.0               | 0.0                | -18.9        | 3.7            | -22.6     | 9/30 kHz  |
| QP            | H               | 2.888         | -17.7          | -1.3                   | 0.2           | 0.0               | 0.0                | -18.8        | 3.7            | -22.5     | 9/30 kHz  |
| QP            | H               | 2.961         | -17.7          | -1.4                   | 0.2           | 0.0               | 0.0                | -18.9        | 3.7            | -22.6     | 9/30 kHz  |
| QP            | H               | 3.025         | -17.5          | -1.6                   | 0.2           | 0.0               | 0.0                | -18.8        | 3.7            | -22.5     | 9/30 kHz  |
| QP            | H               | 3.102         | -17.4          | -1.7                   | 0.2           | 0.0               | 0.0                | -18.9        | 3.7            | -22.6     | 9/30 kHz  |
| QP            | H               | 3.163         | -17.5          | -1.8                   | 0.2           | 0.0               | 0.0                | -19.1        | 3.7            | -22.8     | 9/30 kHz  |
| QP            | H               | 3.243         | -17.2          | -2.0                   | 0.2           | 0.0               | 0.0                | -19.0        | 3.7            | -22.7     | 9/30 kHz  |
| QP            | H               | 3.300         | -17.2          | -2.1                   | 0.2           | 0.0               | 0.0                | -19.1        | 3.7            | -22.8     | 9/30 kHz  |
| QP            | H               | 3.384         | -17.2          | -2.3                   | 0.2           | 0.0               | 0.0                | -19.2        | 3.7            | -22.9     | 9/30 kHz  |
| QP            | H               | 3.438         | -17.0          | -2.4                   | 0.2           | 0.0               | 0.0                | -19.2        | 3.7            | -22.9     | 9/30 kHz  |
| QP            | H               | 3.525         | -16.9          | -2.6                   | 0.2           | 0.0               | 0.0                | -19.3        | 3.7            | -23.0     | 9/30 kHz  |

Notes: The limits were extrapolated to a 3 meter test distance using the methods of AS/NZS 4268 5.4.

**Setup Photos**



Radiated Emissions, 150 kHz – 30 MHz



Radiated Emissions, 150 kHz – 30 MHz

**Test Results:** Pass

**Test Standard:** AS/NZS 4268 8.3, ETSI EN 300 330-1, FCC 15.215, IC RSS-Gen 4.4.1

**Test:** 20 dB Bandwidth

**Performance Criterion:** There is no limit on bandwidth.

**Test Environment:**

|                                          |               |     |                       |      |               |     |
|------------------------------------------|---------------|-----|-----------------------|------|---------------|-----|
| Environmental Conditions During Testing: | Humidity (%): | N/A | Pressure (hPa):       | N/A  | Ambient (°C): | N/A |
| Pretest Verification Performed           | N/A           |     | Equipment under Test: | M640 |               |     |

**Test Equipment Used:**

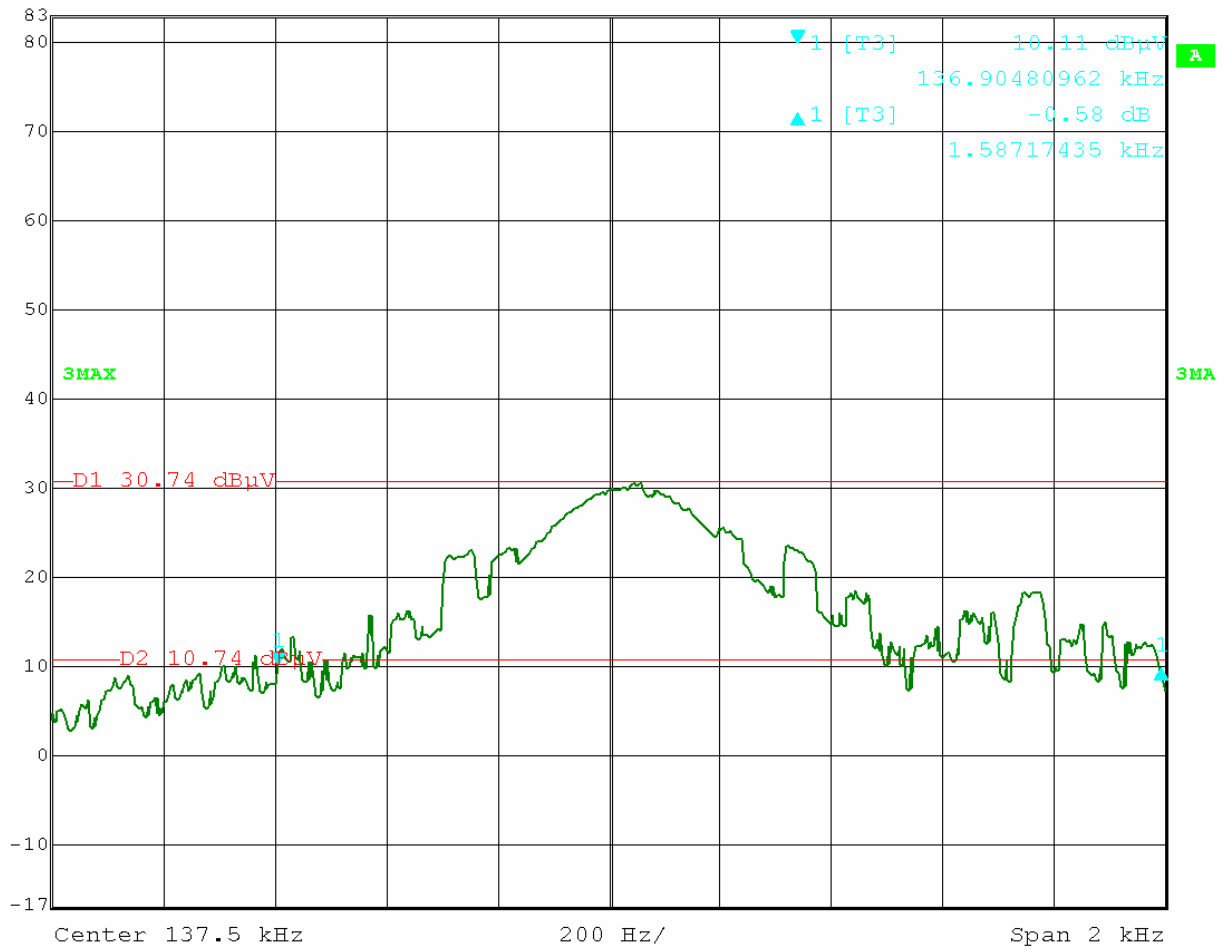
| TEST EQUIPMENT LIST |                                    |                  |           |            |               |
|---------------------|------------------------------------|------------------|-----------|------------|---------------|
| Item                | Equipment Type                     | Make             | Model No. | Serial No. | Next Cal. Due |
| 1                   | Spectrum Analyzer<br>20Hz - 40 GHz | Rohde & Schwartz | FSEK-30   | 100225     | 07/01/2007    |

**Test Details:**

Notes: The 20 dB bandwidth is referenced to the full power of the emission when measured with a bandwidth larger than the bandwidth of the emission. The bandwidth was 1.59 kHz at 137.5 kHz and 1.88 kHz at 141 kHz.



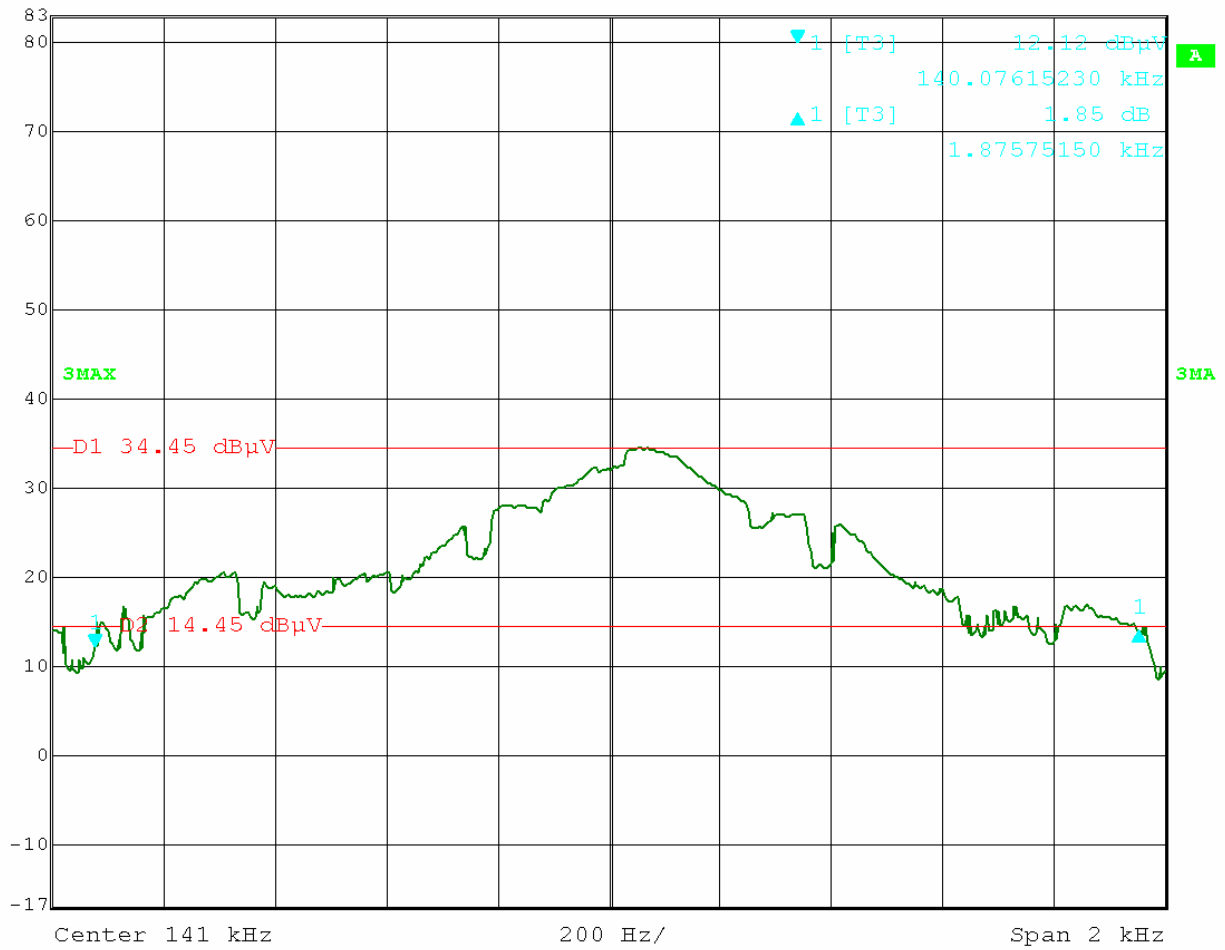
Delta 1 [T3] RBW 200 Hz RF Att 0 dB  
 Ref Lvl -0.58 dB VBW 300 Hz  
 83 dBμV 1.58717435 kHz SWT 760 ms Unit dBμV



Date: 15.SEP.2006 14:35:10  
 137.5 kHz Fundamental: 1.59 kHz 20 dB Bandwidth



Delta 1 [T3] RBW 200 Hz RF Att 0 dB  
 Ref Lvl 1.85 dB VBW 300 Hz  
 83 dBμV 1.87575150 kHz SWT 760 ms Unit dBμV



Date: 15.SEP.2006 14:52:43  
 141 kHz Fundamental: 1.88 kHz 20 dB Bandwidth

**Test Results:** Pass

**Test Standard:** AS/NZS 4268 8.2, ETSI EN 300 330-1 7.4, EN 55022, ETSI EN 301 489, FCC 15.205, 15.209, IC RSS-210 2.7

**Test:** Spurious Emissions above 30 MHz

**Performance Criterion:**

AS/NZS: The spurious emissions must not exceed 0.1 uW (-40 dBm) in Australia and 2.25 uW in New Zealand.

ETSI: The spurious emissions must not exceed 250 nW (-36.0 dBm), except in the ranges from 47-74, 87.5-118, 174-230, and 470-862 MHz, where the limit is 4 nW (-54.0 dBm).

FCC: Emissions must be below the 15.209 limits.

IC: Emissions must be below the RSS-210 2.7 Table 2 limits.

**Test Environment:**

|                                          |               |           |                       |           |               |           |
|------------------------------------------|---------------|-----------|-----------------------|-----------|---------------|-----------|
| Environmental Conditions During Testing: | Humidity (%): | See Table | Pressure (hPa):       | See Table | Ambient (°C): | See Table |
| Pretest Verification Performed           | Yes           |           | Equipment under Test: |           | M640          |           |

**Test Equipment Used:**

| TEST EQUIPMENT LIST |                                   |                   |           |            |               |
|---------------------|-----------------------------------|-------------------|-----------|------------|---------------|
| Item                | Equipment Type                    | Make              | Model No. | Serial No. | Next Cal. Due |
| 1                   | Digital 4 Line Barometer          | Mannix            | 0ABA116   | BAR2       | 08/02/2007    |
| 2                   | ANTENNA                           | EMCO              | 3142      | 9701-1116  | 11/10/2006    |
| 3                   | 3 Meter In floor cable for site 2 | ITS               | RG214B/U  | S2 3M FLR  | 09/26/2007    |
| 4                   | BROADBAND ANTENNA                 | Compliance Design | B100      | 1852       | 09/08/2007    |
| 5                   | BROADBAND ANTENNA                 | Compliance Design | B200      | 1850       | 09/08/2007    |
| 6                   | BROADBAND ANTENNA                 | Compliance Design | B300      | 00674      | 09/08/2007    |
| 7                   | EMI Receiver, 9kHz to 6.5GHz      | Hewlett Packard   | 8546A     | 3410A00173 | 07/26/2007    |
| 8                   | EMI Filter                        | Hewlett Packard   | 85460A    | 344800203  | 07/26/2007    |
| 9                   | Synthesized Sweep Generator       | Hewlett Packard   | 83620A    | 3213A01244 | 01/25/2007    |

### Software Utilized:

| Name           | Manufacturer          | Version          |
|----------------|-----------------------|------------------|
| EXCEL 2000     | Microsoft Corporation | 9.0.6926 SP-3    |
| EMI BOXBOROUGH | Intertek              | 1/17/06 Revision |

### Test Details:

Notes: No emissions were observed. All readings are measurements of the instrumentation noise floor.

### Radiated Emissions, Substitution

Company: Timex Corporation  
 Model #: M640  
 Serial #: 6  
 Engineer(s): Nicholas Abbondante  
 Project #: 3104393  
 Standard: AS/NZS 4268:2003  
 Barometer: BAR2  
 Temp/Humidity/Pressure: 22c  
 Test Distance (m): 3  
 Voltage/Frequency: Fresh 3V Battery  
 Frequency Range: 30-1000 MHz  
 Net = Generator Level (0.00 dBm) + (EUT reading - Generator reading) - Cable Loss + Antenna Gain (dBi or dBd)  
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor RB = Restricted Band; Bandwidth denoted as RBW/VBW

Rx Antenna: LOG1  
 Rx Cable(s): S2 3M FLR  
 Rx Preamp: NONE  
 Tx Antenna: ANT2A  
 Tx Cable(s): NONE  
 Tx Signal Generator: HEW62  
 Receiver: Atlanta5/6  
 ANT2B  
 ANT2C  
 ERP or EIRP?: EIRP

| Detector Type | Ant. Pol. (V/H) | Frequency MHz | EUT Reading dB(uV) | Generator Reading dB(uV) | Transmit Cable Loss dB | Transmit Antenna dBi | Generator Level dBm | Net dBm | Limit dBm | Margin dB | Bandwidth   |
|---------------|-----------------|---------------|--------------------|--------------------------|------------------------|----------------------|---------------------|---------|-----------|-----------|-------------|
| PK            | V               | 42.150        | 5.5                | 60.0                     | 0.2                    | -7.6                 | -20.0               | -82.2   | -40.0     | -42.2     | 120/300 kHz |
| PK            | V               | 132.700       | 1.7                | 70.5                     | 0.3                    | 1.1                  | -20.0               | -88.0   | -40.0     | -48.0     | 120/300 kHz |
| PK            | V               | 355.400       | 2.1                | 55.0                     | 0.5                    | -1.6                 | -20.0               | -74.9   | -40.0     | -34.9     | 120/300 kHz |
| PK            | V               | 489.700       | 3.8                | 57.1                     | 0.5                    | 0.9                  | -20.0               | -73.0   | -40.0     | -33.0     | 120/300 kHz |
| PK            | V               | 610.400       | 1.7                | 55.2                     | 0.6                    | 1.6                  | -20.0               | -72.5   | -40.0     | -32.5     | 120/300 kHz |
| PK            | V               | 912.400       | 2.5                | 49.2                     | 0.8                    | 0.6                  | -20.0               | -66.9   | -40.0     | -26.9     | 120/300 kHz |

### Radiated Emissions, Substitution

|                                                                                                                    |                     |                         |          |                    |          |                      |             |                  |           |             |             |
|--------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------|----------|--------------------|----------|----------------------|-------------|------------------|-----------|-------------|-------------|
| Company:                                                                                                           | Timex Corporation   |                         |          |                    |          | Rx Antenna:          | LOG1        |                  |           |             |             |
| Model #:                                                                                                           | M640                |                         |          |                    |          | Rx Cable(s):         | S2 3M FLR   |                  |           |             |             |
| Serial #:                                                                                                          | 6                   |                         |          |                    |          | Rx Preamp:           | NONE        |                  | Receiver: | Atlanta5/6  |             |
| Engineer(s):                                                                                                       | Nicholas Abbondante |                         |          | Location:          | Site 2   |                      | Tx Antenna: | ANT2A            |           | ANT2B       | ANT2C       |
| Project #:                                                                                                         | 3104393             |                         | Date(s): | 09/18/06           |          | Tx Cable(s):         | NONE        |                  |           |             |             |
| Standard:                                                                                                          | ETSI EN 300 330     |                         |          |                    |          | Tx Signal Generator: | HEW62       |                  |           |             |             |
| Barometer:                                                                                                         | BAR2                | Temp/Humidity/Pressure: | 22c      | 70%                | 999mB    | ERP or EIRP?:        | EIRP        |                  |           |             |             |
| Test Distance (m):                                                                                                 |                     | 3                       |          | Voltage/Frequency: |          | Fresh 3V Battery     |             | Frequency Range: |           | 30-1000 MHz |             |
| Net = Generator Level (0.00 dBm) + (EUT reading - Generator reading) - Cable Loss + Antenna Gain (dBi or dBd)      |                     |                         |          |                    |          |                      |             |                  |           |             |             |
| Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor RB = Restricted Band; Bandwidth denoted as RBW/VBW |                     |                         |          |                    |          |                      |             |                  |           |             |             |
| Detector                                                                                                           | Ant.                |                         | EUT      | Generator          | Transmit | Transmit             | Generator   |                  |           |             |             |
| Type                                                                                                               | Pol.                | Frequency               | Reading  | Reading            | Cable    | Antenna              | Level       | Net              | Limit     | Margin      | Bandwidth   |
|                                                                                                                    | (V/H)               | MHz                     | dB(uV)   | dB(uV)             | Loss dB  | dBi                  | dBm         | dBm              | dBm       | dB          |             |
| PK                                                                                                                 | V                   | 42.150                  | 5.5      | 60.0               | 0.2      | -7.6                 | -20.0       | -82.2            | -36.0     | -46.2       | 120/300 kHz |
| PK                                                                                                                 | V                   | 132.700                 | 1.7      | 70.5               | 0.3      | 1.1                  | -20.0       | -88.0            | -36.0     | -52.0       | 120/300 kHz |
| PK                                                                                                                 | V                   | 355.400                 | 2.1      | 55.0               | 0.5      | -1.6                 | -20.0       | -74.9            | -36.0     | -38.9       | 120/300 kHz |
| PK                                                                                                                 | V                   | 489.700                 | 3.8      | 57.1               | 0.5      | 0.9                  | -20.0       | -73.0            | -54.0     | -19.0       | 120/300 kHz |
| PK                                                                                                                 | V                   | 610.400                 | 1.7      | 55.2               | 0.6      | 1.6                  | -20.0       | -72.5            | -54.0     | -18.5       | 120/300 kHz |
| PK                                                                                                                 | V                   | 912.400                 | 2.5      | 49.2               | 0.8      | 0.6                  | -20.0       | -66.9            | -36.0     | -30.9       | 120/300 kHz |

## Radiated Emissions

Company: Timex Corporation  
 Model #: M640  
 Serial #: 6  
 Engineers: Nicholas Abbondante  
 Project #: 3104393  
 Standard: FCC Part 15 Subpart C 15.209, IC RSS-210 2.7 Table 2  
 Receiver: HP 85462A (Atlanta5/6)  
 PreAmp: NONE  
 Barometer: BAR2  
 Temp/Humidity/Pressure: 21c 53% 1007mB  
 PreAmp Used? (Y or N): N  
 Voltage/Frequency: Fresh 3V Battery  
 Frequency Range: 30-1000 MHz  
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Antenna & Cables: N Bands: N, LF, HF, SHF  
 LF Antenna: Loop1 05-10-07 1m E.ant Loop1 05-10-07 1m H.ant  
 N Antenna: LOG1 11-10-06 V3.ant LOG1 11-10-06 H3.ant  
 HF Antenna: EMP2 08-30-07 1m E.ANT EMP2 08-30-07 1m H.ANT  
 SHF Antenna: NONE.  
 LF Cable(s): CBL022 1-03-07.cbl NONE.  
 N Cable(s): S2 3M FLR 9-26-2007.cbl NONE.  
 HF Cable(s): CBL022 1-03-07.cbl NONE.  
 SHF Cable(s): CBL030 12-12-2006.txt NONE.

Location: Site 2

| Detector Type | Ant. Pol. (V/H) | Frequency MHz | Reading dB(uV) | Antenna Factor dB(1/m) | Cable Loss dB | Pre-amp Factor dB | Distance Factor dB | Net dB(uV/m) | Limit dB(uV/m) | Margin dB | Bandwidth   | FCC | IC |
|---------------|-----------------|---------------|----------------|------------------------|---------------|-------------------|--------------------|--------------|----------------|-----------|-------------|-----|----|
| QP            | V               | 42.150        | 0.1            | 10.6                   | 1.0           | 0.0               | 0.0                | 11.7         | 40.0           | -28.3     | 120/300 kHz |     |    |
| QP            | V               | 132.700       | -0.8           | 7.5                    | 1.4           | 0.0               | 0.0                | 8.1          | 43.5           | -35.4     | 120/300 kHz | RB  | RB |
| QP            | V               | 355.400       | -3.1           | 15.3                   | 2.4           | 0.0               | 0.0                | 14.6         | 46.0           | -31.4     | 120/300 kHz |     |    |
| QP            | V               | 489.700       | -3.1           | 17.6                   | 2.9           | 0.0               | 0.0                | 17.4         | 46.0           | -28.6     | 120/300 kHz |     |    |
| QP            | V               | 610.400       | -4.3           | 19.7                   | 3.5           | 0.0               | 0.0                | 18.9         | 46.0           | -27.1     | 120/300 kHz | RB  | RB |
| QP            | V               | 912.400       | -3.2           | 22.2                   | 4.6           | 0.0               | 0.0                | 23.7         | 46.0           | -22.3     | 120/300 kHz |     |    |

## Radiated Emissions

Company: Timex Corporation  
 Model #: M640  
 Serial #: 6  
 Engineers: Nicholas Abbondante  
 Project #: 3104393  
 Standard: EN 55022 Class B, ETSI EN 301 489  
 Receiver: HP 85462A (Atlanta5/6)  
 PreAmp: NONE  
 Barometer: BAR2  
 Temp/Humidity/Pressure: 21c 53% 1007mB  
 PreAmp Used? (Y or N): N  
 Voltage/Frequency: Fresh 3V Battery  
 Frequency Range: 30-1000 MHz  
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Antenna & Cables: N Bands: N, LF, HF, SHF  
 LF Antenna: Loop1 05-10-07 1m E.ant Loop1 05-10-07 1m H.ant  
 N Antenna: LOG1 11-10-06 V3.ant LOG1 11-10-06 H3.ant  
 HF Antenna: EMP2 08-30-07 1m E.ANT EMP2 08-30-07 1m H.ANT  
 SHF Antenna: NONE.  
 LF Cable(s): CBL022 1-03-07.cbl NONE.  
 N Cable(s): S2 3M FLR 9-26-07.txt NONE.  
 HF Cable(s): CBL022 1-03-07.cbl NONE.  
 SHF Cable(s): CBL030 12-12-2006.txt NONE.

Location: Site 2

| Detector Type | Ant. Pol. (V/H) | Frequency MHz | Reading dB(uV) | Antenna Factor dB(1/m) | Cable Loss dB | Pre-amp Factor dB | Distance Factor dB | Net dB(uV/m) | Limit dB(uV/m) | Margin dB | Bandwidth   |
|---------------|-----------------|---------------|----------------|------------------------|---------------|-------------------|--------------------|--------------|----------------|-----------|-------------|
| QP            | V               | 42.150        | 0.1            | 10.6                   | 0.9           | 0.0               | 10.5               | 1.2          | 30.0           | -28.8     | 120/300 kHz |
| QP            | V               | 132.700       | -0.8           | 7.5                    | 1.5           | 0.0               | 10.5               | -2.3         | 30.0           | -32.3     | 120/300 kHz |
| QP            | V               | 355.400       | -3.1           | 15.3                   | 2.8           | 0.0               | 10.5               | 4.6          | 37.0           | -32.4     | 120/300 kHz |
| QP            | V               | 489.700       | -3.1           | 17.6                   | 3.1           | 0.0               | 10.5               | 7.2          | 37.0           | -29.8     | 120/300 kHz |
| QP            | V               | 610.400       | -4.3           | 19.7                   | 3.4           | 0.0               | 10.5               | 8.4          | 37.0           | -28.6     | 120/300 kHz |
| QP            | V               | 912.400       | -3.2           | 22.2                   | 4.7           | 0.0               | 10.5               | 13.3         | 37.0           | -23.7     | 120/300 kHz |

**Setup Photos**





**Test Results:** Pass

**Test Standard:** AS/NZS 4268 8.4, ETSI EN 300 330-1 7.3

**Test:** Operating Frequencies/ Permitted Frequency Range of the Modulation Bandwidth

**Performance Criterion:**

AS/NZS: The fundamental emissions must remain within the band from 70 kHz to 160 kHz in Australia and between 30 kHz and 190 kHz in New Zealand.

ETSI: The fundamental emissions must remain within the assigned frequency band.

**Test Environment:**

|                                          |               |     |                       |     |               |     |
|------------------------------------------|---------------|-----|-----------------------|-----|---------------|-----|
| Environmental Conditions During Testing: | Humidity (%): | N/A | Pressure (hPa):       | N/A | Ambient (°C): | N/A |
| Pretest Verification Performed           | N/A           |     | Equipment under Test: |     | M640          |     |

**Test Equipment Used:**

| TEST EQUIPMENT LIST |                                    |                      |           |            |               |
|---------------------|------------------------------------|----------------------|-----------|------------|---------------|
| Item                | Equipment Type                     | Make                 | Model No. | Serial No. | Next Cal. Due |
| 1                   | Spectrum Analyzer                  | Agilent              | E7405A    | US40240205 | 08/16/2007    |
| 2                   | Cable, BNC - BNC, 15' long         | Belden               | RG-58/U   | CBL022     | 01/03/2007    |
| 3                   | Digital Multimeter                 | Fluke                | 87 III    | 75250621   | 04/20/2007    |
| 4                   | Small Temperature/Humidity Chamber | Bryant Manufacturing | TH-5S     | 1207       | 04/06/2007    |
| 5                   | ANTENNA, LOOP, 150 kHz - 30 MHz    | Empire               | LP-105A   | 127        | 08/30/2007    |

**Software Utilized:**

| Name           | Manufacturer          | Version          |
|----------------|-----------------------|------------------|
| EXCEL 2000     | Microsoft Corporation | 9.0.6926 SP-3    |
| EMI BOXBOROUGH | Intertek              | 1/17/06 Revision |

## Test Details:

### Frequency Stability

Company: Timex Communication  
Model #: M640  
Serial #: 6

Test Equipment Used:  
AGL001 SAF187 SAF100 EMP2 CBL022

Engineer(s): Nicholas Abbondante  
Project #: 3104393  
Standard: AS/NZS 4268, ETSI EN 300 330

Location: Safety  
Date(s): 09/19/06 9/20/2006

Voltage: 3 VDC

| %    | Voltage<br>Volts | Temp<br>Celsius | Frequency<br>MHz | Deviation<br>kHz | Limit kHz | Power | Deviation<br>dB | F Low kHz | F High<br>kHz |
|------|------------------|-----------------|------------------|------------------|-----------|-------|-----------------|-----------|---------------|
| -10% | 2.7              | -20             | 0.137518         | 0                | 0.00      | 40.04 | -8.83           | 137.125   | 138.331       |
| +0%  | 3                | -20             | 0.137518         | 0                | 0.00      | 41.41 | -7.46           | 137.118   | 138.312       |
| +0%  | 3                | +20             | 0.137518         | 0                | 0.00      | 48.87 | 0               | 137.125   | 138.368       |
| -10% | 2.96             | +55             | 0.137525         | 0.007            | 0.00      | 46.07 | -2.8            | 136.856   | 138.268       |
| +0%  | 3                | +55             | 0.137518         | 0                | 0.00      | 49.92 | 1.05            | 137.1     | 138.537       |
| Max  |                  |                 |                  |                  |           |       |                 | 136.856   | 138.268       |

| %    | Voltage<br>Volts | Temp<br>Celsius | Frequency<br>MHz | Deviation<br>kHz | Limit kHz | Power | Deviation<br>dB | F Low kHz | F High<br>kHz |
|------|------------------|-----------------|------------------|------------------|-----------|-------|-----------------|-----------|---------------|
| -10% | 2.7              | -20             | 0.141031         | -0.012           | 0.00      | 44.21 | -8.45           | 140.268   | 141.487       |
| +0%  | 3                | -20             | 0.14105          | 0.007            | 0.00      | 45.53 | -7.13           | 140.275   | 141.468       |
| +0%  | 3                | +20             | 0.141043         | 0                | 0.00      | 52.66 | 0               | 140.275   | 141.525       |
| -10% | 2.96             | +55             | 0.141043         | 0                | 0.00      | 49.1  | -3.56           | 140.268   | 141.812       |
| +0%  | 3                | +55             | 0.141043         | 0                | 0.00      | 49.42 | -3.24           | 140.243   | 141.475       |
| Max  |                  |                 |                  |                  |           |       |                 | 140.243   | 141.468       |

At +55 degrees Celsius, the EUT shut off if voltage dropped below 2.958 V.

AS/NZS Notes: Given the ~1.59 kHz bandwidth at 137.5 kHz and the ~1.88 kHz bandwidth at 141.0 kHz measured previously, and the maximum measured frequency drift of 12 Hz, the fundamental frequencies meet the requirements to stay in band. The power shown in the table is a relative value and is not representative of actual EUT output power.

ETSI EN 300 330 Notes: The spurious limit is 15.2 dBuA/m at 137.5 kHz, and 15.1 dBuA/m at 141.0 kHz at 10 meters. The fundamental field strength is well below the spurious limits, after adjustment by a 31.37 dB distance factor. This factor is used to extrapolate the 10m limit to the 3m fundamental field strength measurement distance, obtained using the methods of ETSI EN 300 330 Annex J. Therefore since the fundamental field strength is lower than the spurious limit, the EUT meets the requirements. The power shown in the table is a relative value and is not representative of actual EUT output power.

**Test Results:** Pass

**Test Standard:** Basic Standards from EN 55024 and ETSI EN 301 489

**Test:** ESD

**Performance Criterion:** B, See Section 1.7

**Test Environment:**

|                                          |               |          |                       |             |               |          |
|------------------------------------------|---------------|----------|-----------------------|-------------|---------------|----------|
| Environmental Conditions During Testing: | Humidity (%): | 45<br>36 | Pressure (hPa):       | 992<br>1011 | Ambient (°C): | 22<br>22 |
| Pretest Verification Performed           | Yes           |          | Equipment under Test: | M640        |               |          |

**Maximum Test Disturbance Parameters:** ±4kV Contact discharge, ±8kV Air discharge

**Test Equipment Used:**

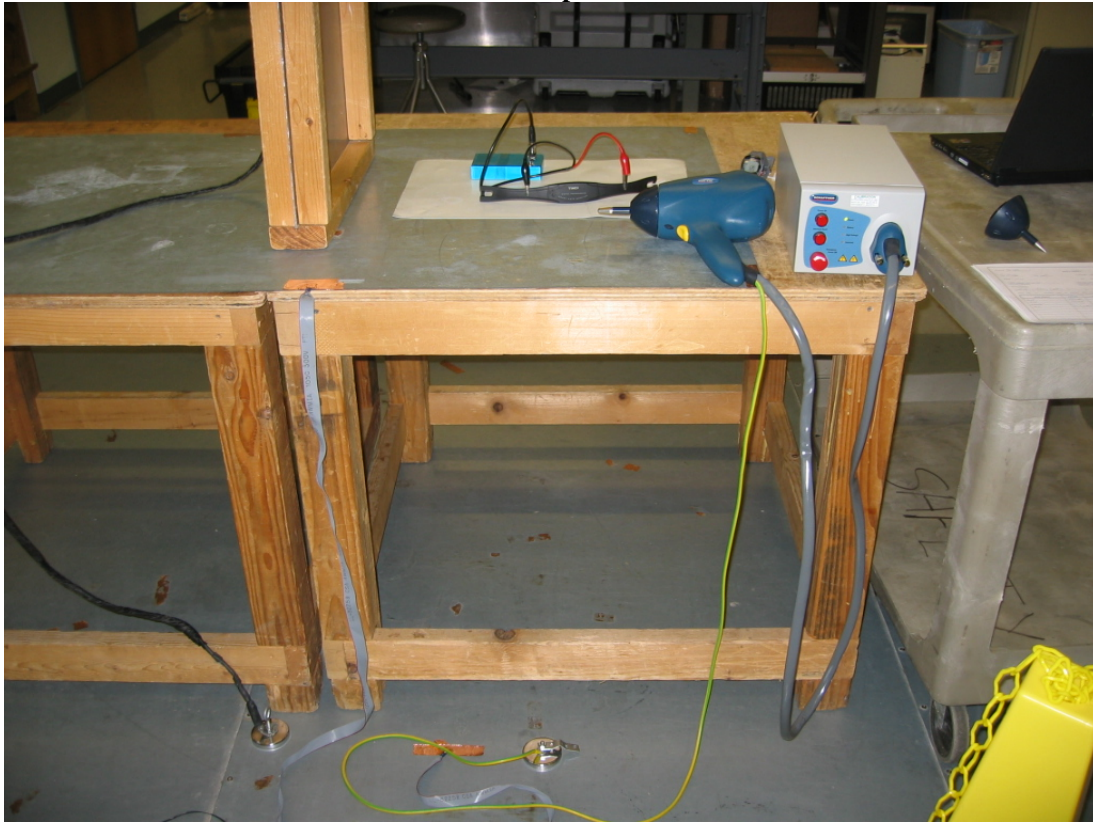
| TEST EQUIPMENT LIST |                          |                    |           |            |               |
|---------------------|--------------------------|--------------------|-----------|------------|---------------|
| Item                | Equipment Type           | Make               | Model No. | Serial No. | Next Cal. Due |
| 1                   | ESD Test Set             | Schaffner          | NSG438    | 557        | 04/21/2007    |
| 2                   | Electrostatic Voltmeter  | Sensitive Research | ESH       | U24187     | 01/05/2007    |
| 3                   | 6 line Digital Barometer | Mannix             | 0ABA8886  | SAF285     | 11/04/2006    |

**Test Details:**

| Test Point         | Standard Limit<br>(as published) | Compliance<br>Level   | Pass<br>Fail<br>N/A | Comment                   |
|--------------------|----------------------------------|-----------------------|---------------------|---------------------------|
| HCP                | $\pm 2, 4 \text{ kV}$            | $\pm 2, 4 \text{ kV}$ | Pass                | No Effect                 |
| VCP                | $\pm 2, 4 \text{ kV}$            | $\pm 2, 4 \text{ kV}$ | Pass                | See Notes                 |
| Contact Discharges | $\pm 2, 4 \text{ kV}$            | $\pm 2, 4 \text{ kV}$ | Pass                | No conductive<br>surfaces |
| Air Discharges     | $\pm 2, 4, 6, 8 \text{ kV}$      | $\pm 2, 4 \text{ kV}$ | Pass                | See Notes                 |

Notes – During the test, the BPM stayed within  $\pm 1 \text{ BPM}$  of the nominal 120 BPM value.

**ESD Setup Photo**



**Test Results:** Pass

**Test Standard:** Basic Standards from EN 55024 and ETSI EN 301 489

**Test:** Radiated RF Susceptibility

**Performance Criterion:** A, See Section 1.7

**Test Environment:**

|                                          |               |          |                       |             |               |          |
|------------------------------------------|---------------|----------|-----------------------|-------------|---------------|----------|
| Environmental Conditions During Testing: | Humidity (%): | 43<br>36 | Pressure (hPa):       | 992<br>1011 | Ambient (°C): | 23<br>22 |
| Pretest Verification Performed           | Yes           |          | Equipment under Test: | M640        |               |          |

**Maximum Test Disturbance Parameters:** 80-1000, 1400-2000 MHz @ 3 V/m, 1kHz AM 80% modulation

**Test Equipment Used:**

| TEST EQUIPMENT LIST |                                     |                    |                       |            |               |
|---------------------|-------------------------------------|--------------------|-----------------------|------------|---------------|
| Item                | Equipment Type                      | Make               | Model No.             | Serial No. | Next Cal. Due |
| 1                   | METER, POWER                        | Hewlett Packard    | 436A/022              | 2604A25294 | 04/27/2007    |
| 2                   | Attenuator, SWITCH DRIVER           | Hewlett Packard    | 11713A                | 2421A03484 | Verified      |
| 3                   | Generator, Signal                   | Hewlett Packard    | 8648C                 | 3847A05291 | 01/04/2007    |
| 4                   | SENSOR, POWER                       | Hewlett Packard    | 8481A                 | 2349A38886 | 11/23/2006    |
| 5                   | Dual Directional Coupler            | Amplifier Research | DC7144, .8 - 4.2GHz   | 28765      | 11/14/2006    |
| 6                   | AMPLIFIER, 50W, .8 - 4.2GHz         | Amplifier Research | 50S1G4A               | 29183      | Verified      |
| 7                   | Istropic Field Probe                | Amplifier Research | FP2000                | 16896      | 07/28/2007    |
| 8                   | Antenna, Log Periodic, 80 - 1000MHz | Amplifier Research | AT1080                | 15259      | Verified      |
| 9                   | MICROWAVE HORN ANTENNA              | Amplifier Research | AT4002, 1- 4.2GHz, 25 | 21499      | Verified      |
| 10                  | AMPLIFIER; 100W; 200-1000MHz        | Kalmus             | 717FC/1-70-563-002    | 8053-2     | Verified      |
| 11                  | AMPLIFIER; 1kW; 10kHz-200MHz        | Kalmus             | 137C/1-60-105-002     | 8044-1     | Verified      |
| 12                  | COUPLER, BI-DIRECTIONAL             | Werlatone inc.     | C3910                 | 5284       | 03/06/2007    |
| 13                  | COUPLER, BI-DIRECTIONAL             | Werlatone inc.     | C5960                 | 7727       | 12/13/2006    |
| 14                  | Isotropic Field Monitor             | Amplifier Research | FM2000                | 16839      | Verified      |
| 15                  | Istropic Field Probe                | Amplifier Research | FP2000                | 15398      | 08/04/2007    |

|    |                          |                 |          |            |            |
|----|--------------------------|-----------------|----------|------------|------------|
| 16 | Generator, Signal        | Hewlett Packard | 8648B    | 3537A01040 | 08/23/2007 |
| 17 | 6 line Digital Barometer | Mannix          | 0ABA8886 | SAF285     | 11/04/2006 |

**Software Utilized:**

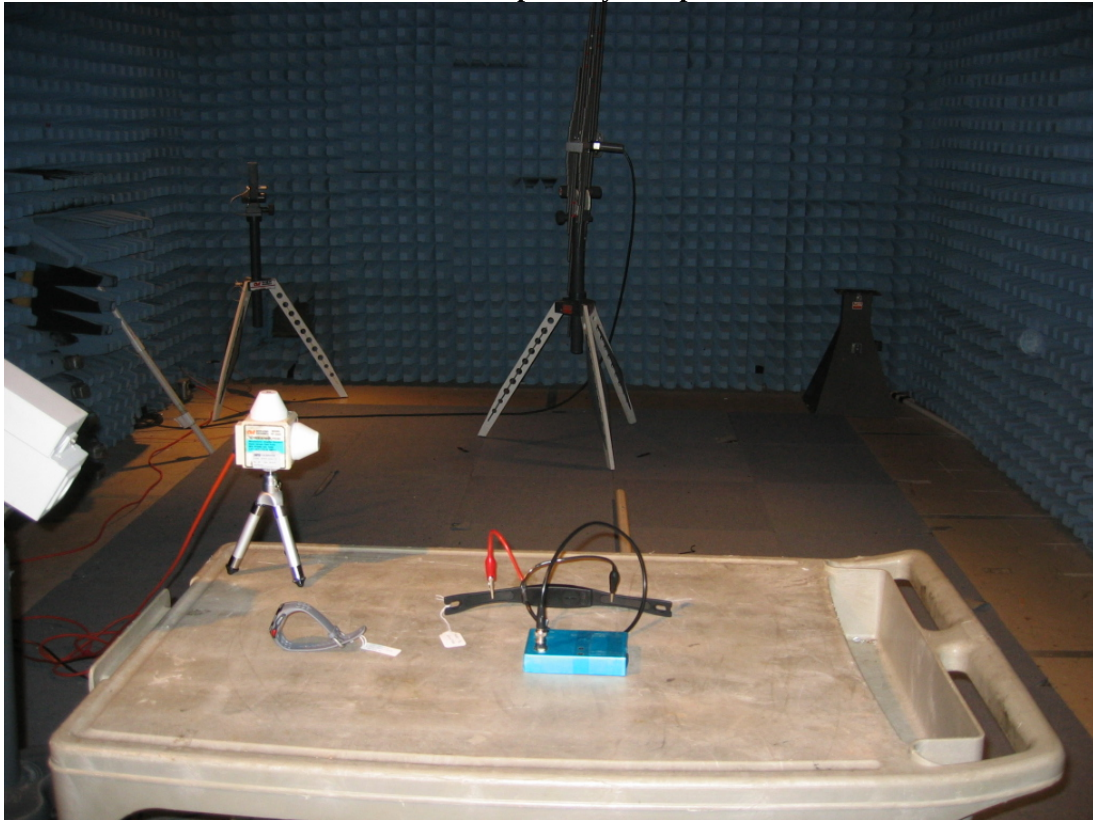
| Name | Manufacturer                    | Version |
|------|---------------------------------|---------|
| TILE | Quantum Change/EMC Systems, LLC | 3.2.L   |

**Test Details:**

| Test Point | Standard Limit<br>(as published) | Compliance<br>Level | Pass<br>Fail<br>N/A | Comment   |
|------------|----------------------------------|---------------------|---------------------|-----------|
| Front      | 3 V/m (h&v)                      | 3 V/m (h&v)         | Pass                | See Notes |

During the test, at vertical and horizontal polarities, the BPM varied by +/-3 BPM across the entire range.

**Radiated Susceptibility Setup Photo**



**Test Results:** Pass

**Test Standard:** Basic Standards from EN 55024 and ETSI EN 301 489

**Test:** Power Frequency Magnetics

**Performance Criterion:** A, See Section 1.7

**Test Environment:**

|                                          |               |    |                       |      |               |    |
|------------------------------------------|---------------|----|-----------------------|------|---------------|----|
| Environmental Conditions During Testing: | Humidity (%): | 45 | Pressure (hPa):       | 992  | Ambient (°C): | 22 |
| Pretest Verification Performed           | Yes           |    | Equipment under Test: | M640 |               |    |

**Maximum Test Disturbance Parameters:** 1 A/M

**Test Equipment Used:**

| TEST EQUIPMENT LIST |                                                                                                                                                                                     |                   |                    |            |               |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------|------------|---------------|
| Item                | Equipment Type                                                                                                                                                                      | Make              | Model No.          | Serial No. | Next Cal. Due |
| 1                   | EMC Test System consisting of: NSG-1007-45 (SN 55512), CCN 1000-3 (SN 72203), INA 2197 (SN 72200), INA 2196 (SN 72198), INA 2145 (SN 72199), INA 2171 (SN 8006), INA 2141 (SN 6012) | Schaffner         | MX45-3PI-CTSHL-SCH | 43964      | 01/18/2008    |
| 2                   | Spectrum Analyzer                                                                                                                                                                   | Hewlett Packard   | 3585B              | 3008A00932 | 05/16/2007    |
| 3                   | ANTENNA, LOOP                                                                                                                                                                       | Solar Electronics | 7334-1             | 11899      | 11/08/2006    |
| 4                   | 6 line Digital Barometer                                                                                                                                                            | Mannix            | 0ABA8886           | SAF285     | 11/04/2006    |

**Software Utilized:**

| Name    | Manufacturer | Version |
|---------|--------------|---------|
| WIN2120 | Schaffner    | 2.60    |

**Test Details:**

| Test Point | Standard Limit (as published) | Compliance Level | Pass Fail N/A | Comment   |
|------------|-------------------------------|------------------|---------------|-----------|
| X,Y&Z Axis | 1A/m 50 Hz                    | 1A/m 50 Hz       | Pass          | No Effect |

**Power Frequency Magnetics Setup Photo**

