

## EMC TEST REPORT

**Report Number: 3124574BOX-001**

**Project Number: 3124574**

**Testing performed on the**

**Model: M805**

**To**

**AS/NZS 4268:2003**

**ETSI EN 300 220-1 V2.1.1 (2006-04)**

**ETSI EN 300 220-2 V2.1.1 (2006-04)**

**ETSI EN 300 220-3 V1.1.1 (2000-09)**

**ETSI EN 301 489-1 V1.7.1 (2007-04)**

**ETSI EN 301 489-3 V1.4.1 (2002-08)**

**FCC Part 15 Subpart C 15.231**


**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:   
Vathana Ven

Date: 06-12-2007

Reviewed by:   
Michael Murphy

Date: 06-14-2007

*This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to copy or distribute this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program. This report must not be used to claim product endorsement by A2LA, NIST nor any other agency of the U.S. Government.*

**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)

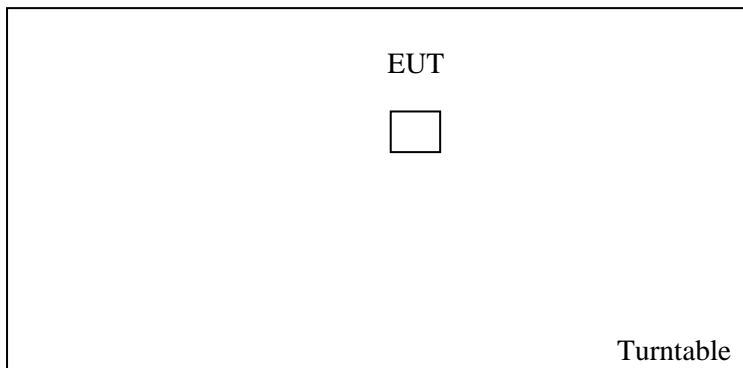
**1.2 Equipment Under Test**

**Equipment Type:** Transmitter  
**Model Number(s):** M805  
**Serial number(s):** ENG690 #2  
**Manufacturer:** Timex Corporation  
**EUT receive date:** 06/05/2007  
**EUT received condition:** Prototype in good condition  
**Test start date:** 06/05/2007  
**Test end date:** 06/12/2007

**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.

**1.4 Test Configuration/Operating Voltage :** The device was operated by battery power.

**1.4.1 Block Diagram**



**1.4.2. Cables:**

None

### 1.4.3. Support Equipment:

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

### 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 EUT transmitted signal continuously.

**1.5a EUT Cycle Time:** Continuous.

### 1.6 Monitoring of Sample:

The EUT was monitored via the spectrum analyzer display which showed the continuous transmitted signal.

### 1.7 Sample 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 V1.7.1 (2007-04)

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.

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

## 2.0 Test Summary

TEST STANDARD		
<b>AS/NZS 4268:2003</b> ETSI EN 300 220-1 V2.1.1 (2006-04) ETSI EN 300 220-2 V2.1.1 (2006-04) ETSI EN 300 220-3 V1.1.1 (2000-09) ETSI EN 301 489-1 V1.7.1 (2007-04) ETSI EN 301 489-3 V1.4.1 (2002-08) FCC Part 15 Subpart C 15.231 <b>Industry Canada RSS-210 Issue 6 September 2005</b>		
SUB-TEST	TEST PARAMETER	NOTE
<b>AS/NZS 4268:2003</b> ETSI EN 300 220-1 V2.1.1 (2006-04) ETSI EN 300 220-2 V2.1.1 (2006-04) ETSI EN 300 220-3 V1.1.1 (2000-09) ETSI EN 301 489-1 V1.7.1 (2007-04) ETSI EN 301 489-3 V1.4.1 (2002-08) FCC Part 15 Subpart C 15.231 <b>Industry Canada RSS-210 Issue 6 September 2005</b>		
RF Output Power and Spurious Emissions AS/NZS 4268 5.3, 8.2 ETSI EN 300 220-1 8.3 ERC/REC 70-03 Annex 1 FCC 15.205, 15.209 IC RSS-210 6.1	AS/NZS (Australia only): The fundamental field strength must not exceed 25 mW (109.2 dBuV/m at 3m). The spurious emissions must not exceed 0.1 uW (55.2 dBuV/m). ETSI: The fundamental field strength at 433.9 MHz must not exceed 10 mW (ERC/REC 70-03). The field strength of spurious emissions must not exceed 1 uW. FCC: Emissions must be below the 15.231 limits. IC: Emissions must be below the RSS-210 6.1 Table 1 limits.	Pass
Occupied Bandwidth AS/NZS 4268 8.3 ETSI EN 300 220-1 8.3 FCC 15.231 IC RSS-Gen 4.4.1	There is no limit on bandwidth.	Pass
Operating Frequencies/ Permitted Frequency Range of the Modulation Bandwidth AS/NZS 4268 8.4 ETSI EN 300 220-1 8.1	AS/NZS (Australia only): The fundamental emissions must remain within the band from 433.05 MHz to 434.79 MHz ETSI: Frequency error or frequency drift is 3 KHz.	Pass
Adjacent channel power ETSI EN 300 220-1 8.5	ETSI: The adjacent channel power must not exceed 10 uW (-20 dBm).	Pass
<b>ETSI EN 301 489-1 V1.7.1 (2007-04)</b> <b>ETSI EN 301 489-3 V1.4.1 (2002-08)</b> <b>Emissions</b>		
Radiated Emissions	Emissions below specified limits	Pass
<b>ETSI EN 301 489-1 V1.7.1 (2007-04)</b> <b>ETSI EN 301 489-3 V1.4.1 (2002-08)</b> <b>Immunity</b>		
EN 61000-4-2:1995 Electrostatic Discharge (ESD)	±4kV Contact discharge and ±8kV Air discharge	Pass
EN 61000-4-3:1996 Electromagnetic Field Immunity	80-1000MHz & 1400-2000MHz @ 3V/m at 1kHz 80% AM modulation	Pass

Notes:

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

<u>Date</u>	<u>Project No.</u>	<u>Project Handler</u>	<u>Page(s)</u>	<u>Item</u>	<u>Description of Change</u>
-------------	--------------------	------------------------	----------------	-------------	------------------------------

### 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):** 2C, EMC, and Safety Labs

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 5.3, 8.2, ETSI EN 300 220-1 8.3, ERC/REC 70-03 Annex 1, FCC 15.205, 15.209 and IC RSS-210 6.1

**Test:** RF Output Power and Spurious Emissions

**Performance Criterion:** AS/NZS (Australia only): The fundamental field strength must not exceed 25 mW (109.2 dBuV/m at 3m). The spurious emissions must not exceed 0.1 uW (55.2 dBuV/m at 3m).

ETSI: The fundamental field strength at 433.9 MHz must not exceed 10 mW (ERC/REC 70-03). The field strength of spurious emissions must not exceed 1 uW.

FCC: Emissions must be below the 15.231 limits.

IC: Emissions must be below the RSS-210 6.1 Table 1 limits.

**Test Environment:**

Environmental Conditions During Testing:	Humidity (%):	26	Pressure (hPa):	1009	Ambient (°C):	21
Pretest Verification Performed	Yes		Equipment under Test:	M805		

**Test Equipment Used:**

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	EMI Receiver, 9kHz to 6.5GHz	Hewlett Packard	8546A	3410A00173	07/26/2007
2	EMI Filter	Hewlett Packard	85460A	344800203	07/26/2007
3	Digital 4 Line Barometer	Mannix	0ABA116	BAR2	05/20/2008
4	ANTENNA	EMCO	3142	9701-1116	12/04/2007
5	HORN ANTENNA	EMCO	3115	9610-4980	06/12/2007
6	3 Meter In floor cable for site 2	ITS	RG214B/U	S2 3M FLR	09/26/2007
7	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 197	CBL027	12/04/2007
8	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 197	CBL028	12/04/2007
9	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL029	12/04/2007
10	ANTENNA, RIDGED GUIDE, 1-18 GHZ	EMCO	3115	2784	08/11/2007



11	Synthesized Sweep Generator	Hewlett Packard	83620A	3213A01244	02/06/2009
12	PREAMPLIFIER 1-40 GHz	MITEQ	NSP4000-NF	507145	11/14/2007

**Software Utilized:**

<b>Name</b>	<b>Manufacturer</b>	<b>Version</b>
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	2/07/05 Revision

**Test Results:**

**Radiated Emissions**

Company: Timex Corporation      Antenna & Cables: N      Bands: N, LF, HF, SHF  
 Model #: M805      LF Antenna: NONE.      NONE.  
 Serial #: ENG690 #2      N Antenna: LOG1 12-04-2007 V3.txt      LOG1 12-04-2007 H3.txt  
 Engineers: Vathana Ven      Location: Site 2      HF Antenna: HORN3 V3m 6-12-08.txt      HORN3 H3m 6-12-08.txt  
 Project #: 3124574      Date(s): 06/04/07      SHF Antenna: NONE.      NONE.  
 Standard: FCC Part 15 Subpart C 15.231, IC RSS-210      LF Cable(s): NONE.      NONE.  
 Receiver: HP 85462A (Atlanta5/6)      Limit Distance (m): 3      N Cable(s): S2 3M FLR 9-26-07.txt      NONE.  
 PreAmp: PRE8 11-14-07.txt      Test Distance (m): 3      HF Cable(s): CBL027 12-04-2007.txt      CBL028 12-04-2007.txt  
 Barometer: BAR2      Temp/Humidity/Pressure: 21 deg. C 26% 1009 mb      SHF Cable(s): NONE.      NONE.  
 PreAmp Used? (Y or N): N      Voltage/Frequency: Fresh 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

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	H	433.900	51.5	16.6	3.0	0.0	0.0	71.0	80.8	-9.8	120/300 kHz
AVG	H	433.900	39.5	16.6	3.0	0.0	0.0	59.0	80.8	-21.8	120/300 kHz
AVG	V	867.800	11.3	23.0	4.8	0.0	0.0	39.2	60.8	-21.6	120/300 kHz

**Special Radiated Emissions**

Company: Timex Corporation      Antenna & Cables: HF      Bands: N, LF, HF, SHF  
 Model #: M805      LF Antenna: NONE.      NONE.  
 Serial #: ENG690 #2      N Antenna: LOG1 12-04-2007 V3.txt      LOG1 12-04-2007 H3.txt  
 Engineers: Vathana Ven      Location: Site 2      HF Antenna: HORN3 V3m 6-12-08.txt      HORN3 H3m 6-12-08.txt  
 Project #: 3124574      Date(s): 06/04/07      SHF Antenna: NONE.      NONE.  
 Standard: FCC Part 15 Subpart C 15.231, IC RSS-210      LF Cable(s): NONE.      NONE.  
 Receiver: HP 85462A (Atlanta5/6)      Limit Distance (m): 3      N Cable(s): S2 3M FLR 9-26-07.txt      NONE.  
 PreAmp: PRE8 11-14-07.txt      Test Distance (m): 3      HF Cable(s): CBL027 12-04-2007.txt      CBL028 12-04-2007.txt  
 Barometer: BAR2      Temp/Humidity/Pressure: 21 deg. C 26% 1009 mb      SHF Cable(s): NONE.      NONE.  
 PreAmp Used? (Y or N): Y      Voltage/Frequency: Fresh Battery      Frequency Range: 1-5 GHz  
 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
AVG	V	1302.000	27.9	25.4	4.3	19.9	0.0	37.7	54.0	-16.3	1/3 MHz
AVG	V	1736.000	26.2	27.3	5.1	20.0	0.0	38.6	60.8	-22.2	1/3 MHz
AVG	H	2170.000	33.9	29.4	5.9	20.1	0.0	49.1	60.8	-11.7	1/3 MHz
AVG	H	2603.000	29.8	30.5	6.5	20.3	0.0	46.5	60.8	-14.3	1/3 MHz
AVG	H	3037.000	26.4	31.9	7.0	20.5	0.0	44.8	60.8	-16.0	1/3 MHz
AVG	H	3471.000	20.6	32.6	7.6	20.5	0.0	40.3	60.8	-20.5	1/3 MHz
AVG	H	3905.000	16.0	33.8	8.0	20.9	0.0	36.8	54.0	-17.2	1/3 MHz
AVG	H	4339.000	15.0	34.5	8.5	21.2	0.0	36.8	54.0	-17.2	1/3 MHz

Notes:

**Test Results continue:**

**Radiated Emissions, Substitution**

Company: Timex Corporation  
 Model # M805  
 Serial #: ENG690 #2  
 Engineer(s): Vathana Ven  
 Project #: 3124574  
 Standard: ETSI 300 220-1  
 Barometer: BAR2  
 Temp/Humidity/Pressure: 21 deg. C 26% 1009 mb  
 Test Distance (m): 3  
 Voltage/Frequency: Fresh Battery  
 Frequency Range: 30 MHz - 5GHz  
 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: HORN 3  
 Rx Cable(s): CBL027 CBL028  
 Rx Preamp: PRE8 Receiver: HP 85462A (Atlanta5/R)  
 Location: Site 2  
 Tx Antenna: EMC02  
 Tx Cable(s): CBL029  
 Tx Signal Generator: HEW62  
 ERP or EIRP?: ERP

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	H	433.900	51.5	79.1	0.5	0.8	0.0	-29.5	0.0	-29.5	120/300 KHz
PK	V	867.800	22.8	69.5	0.7	1.7	0.0	-47.9	-36.0	-11.9	120/300 KHz
PK	V	1302.000	40.6	91.8	0.9	8.3	0.0	-46.0	-30.0	-16.0	1/3 MHz
PK	V	1736.000	39.2	90.8	1.1	8.3	0.0	-46.5	-30.0	-16.5	1/3 MHz
PK	H	2170.000	46.5	89.0	1.3	9.5	0.0	-36.5	-30.0	-6.5	1/3 MHz
PK	H	2603.000	42.4	89.1	1.5	9.5	0.0	-40.9	-30.0	-10.9	1/3 MHz
PK	H	3037.000	39.2	85.9	1.5	9.5	0.0	-40.9	-30.0	-10.9	1/3 MHz
PK	H	3471.000	33.4	85.7	1.6	9.4	0.0	-46.6	-30.0	-16.6	1/3 MHz
PK	H	3905.000	29.1	84.5	1.7	9.4	0.0	-49.8	-30.0	-19.8	1/3 MHz
PK	H	4339.000	29.0	83.0	1.8	10.7	0.0	-47.2	-30.0	-17.2	1/3 MHz

**Test Results continue:**

**Radiated Emissions**

Company: Timex Corporation      Antenna & Cables: N      Bands: N, LF, HF, SHF  
 Model #: M805      LF Antenna: NONE.      NONE.  
 Serial #: ENG690 #2      N Antenna: LOG1 12-04-2007 V3.txt      LOG1 12-04-2007 H3.txt  
 Engineers: Vathana Ven      Location: Site 2      HF Antenna: HORN3 V3m 6-12-07.txt      HORN3 H3m 6-12-07.txt  
 Project #: 3124574      Date(s): 06/04/07      SHF Antenna: NONE.      NONE.  
 Standard: AS/NZS 4268      LF Cable(s): NONE.      NONE.  
 Receiver: HP 85462A (Atlanta5/6)      Limit Distance (m): 3      N Cable(s): S2 3M FLR 9-26-07.txt      NONE.  
 PreAmp: PRE8 11-14-07.txt      Test Distance (m): 3      HF Cable(s): CBL027 12-04-2007.txt      CBL028 12-04-2007.txt  
 Barometer: BAR2      Temp/Humidity/Pressure: 21 deg. C 26%      1009 mb      SHF Cable(s): NONE.      NONE.  
 PreAmp Used? (Y or N): N      Voltage/Frequency: Fresh 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

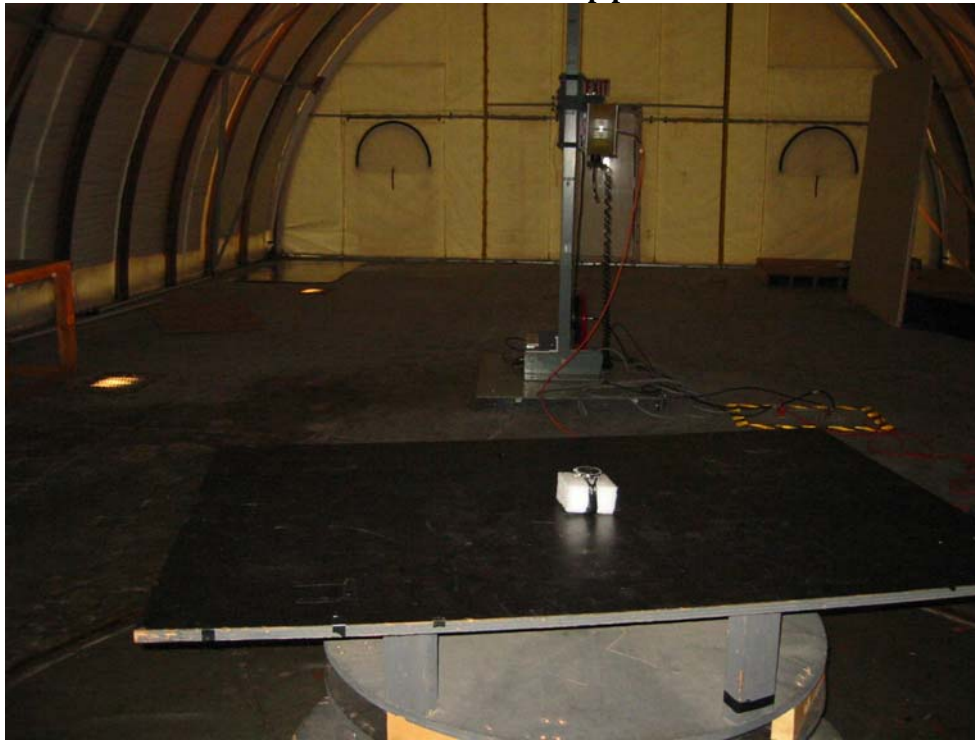
Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
PK	H	433.900	51.5	16.6	3.0	0.0	0.0	71.0	109.2	-38.2	120/300 kHz
AVG	H	433.900	39.5	16.6	3.0	0.0	0.0	59.0	109.2	-50.2	120/300 kHz
PK	V	867.800	17.8	23.0	4.8	0.0	0.0	45.7	55.2	-9.5	120/300 kHz
AVG	V	867.800	6.3	23.0	4.8	0.0	0.0	34.2	55.2	-21.0	120/300 kHz

**Special Radiated Emissions**

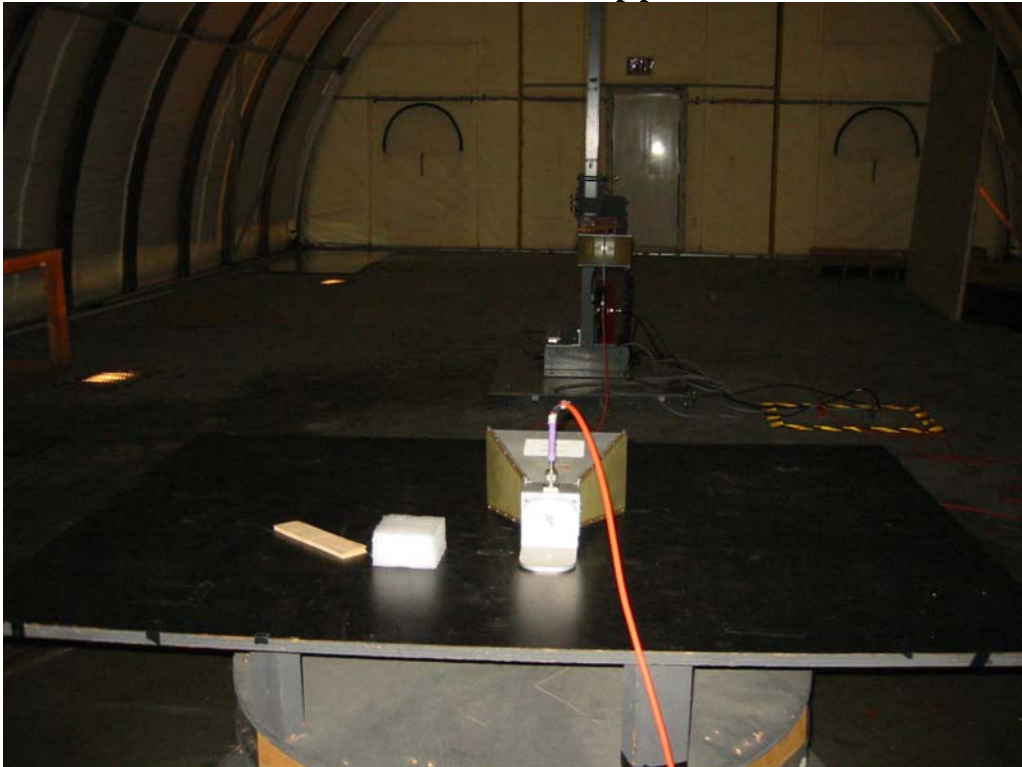
Company: Timex Corporation      Antenna & Cables: HF      Bands: N, LF, HF, SHF  
 Model #: M805      LF Antenna: NONE.      NONE.  
 Serial #: ENG690 #2      N Antenna: LOG1 12-04-2007 V3.txt      LOG1 12-04-2007 H3.txt  
 Engineers: Vathana Ven      Location: Site 2      HF Antenna: HORN3 V3m 6-12-07.txt      HORN3 H3m 6-12-07.txt  
 Project #: 3124574      Date(s): 06/04/07      SHF Antenna: NONE.      NONE.  
 Standard: AS/NZS 4268      LF Cable(s): NONE.      NONE.  
 Receiver: HP 85462A (Atlanta5/6)      Limit Distance (m): 3      N Cable(s): S2 3M FLR 9-26-07.txt      NONE.  
 PreAmp: PRE8 11-14-07.txt      Test Distance (m): 3      HF Cable(s): CBL027 12-04-2007.txt      CBL028 12-04-2007.txt  
 Barometer: BAR2      Temp/Humidity/Pressure: 21 deg. C 26%      1009 mb      SHF Cable(s): NONE.      NONE.  
 PreAmp Used? (Y or N): Y      Voltage/Frequency: Fresh Battery      Frequency Range: 1-5 GHz  
 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	1302.000	35.6	25.4	4.3	19.9	0.0	45.4	55.2	-9.8	1/3 MHz
AVG	V	1302.000	22.9	25.4	4.3	19.9	0.0	32.7	55.2	-22.5	1/3 MHz
PK	V	1736.000	34.2	27.3	5.1	20.0	0.0	46.6	55.2	-8.6	1/3 MHz
AVG	V	1736.000	21.2	27.3	5.1	20.0	0.0	33.6	55.2	-21.6	1/3 MHz
PK	H	2170.000	40.0	29.4	5.9	20.1	0.0	55.2	55.2	-0.0	1/3 MHz
AVG	H	2170.000	28.9	29.4	5.9	20.1	0.0	44.1	55.2	-11.1	1/3 MHz
PK	H	2603.000	37.4	30.5	6.5	20.3	0.0	54.1	55.2	-1.1	1/3 MHz
AVG	H	2603.000	24.8	30.5	6.5	20.3	0.0	41.5	55.2	-13.7	1/3 MHz
PK	H	3037.000	34.2	31.9	7.0	20.5	0.0	52.6	55.2	-2.6	1/3 MHz
AVG	H	3037.000	21.4	31.9	7.0	20.5	0.0	39.8	55.2	-15.4	1/3 MHz
PK	H	3471.000	27.4	32.6	7.6	20.5	0.0	47.1	55.2	-8.1	1/3 MHz
AVG	H	3471.000	15.6	32.6	7.6	20.5	0.0	35.3	55.2	-19.9	1/3 MHz
PK	H	3905.000	24.1	33.8	8.0	20.9	0.0	44.9	55.2	-10.3	1/3 MHz
AVG	H	3905.000	11.0	33.8	8.0	20.9	0.0	31.8	55.2	-23.4	1/3 MHz
PK	H	4339.000	24.0	34.5	8.5	21.2	0.0	45.8	55.2	-9.4	1/3 MHz
AVG	H	4339.000	10.0	34.5	8.5	21.2	0.0	31.8	55.2	-23.4	1/3 MHz

**Radiated emissions setup photos**



**Substitution method setup photos**



**Test Results:** Pass

**Test Standard:** AS/NZS 4268 8.3, ETSI EN 300 220-1, FCC 15.231, 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 (%):	26	Pressure (hPa):	1009	Ambient (°C):	21
Pretest Verification Performed	Yes		Equipment under Test:	M805		

**Test Equipment Used:**

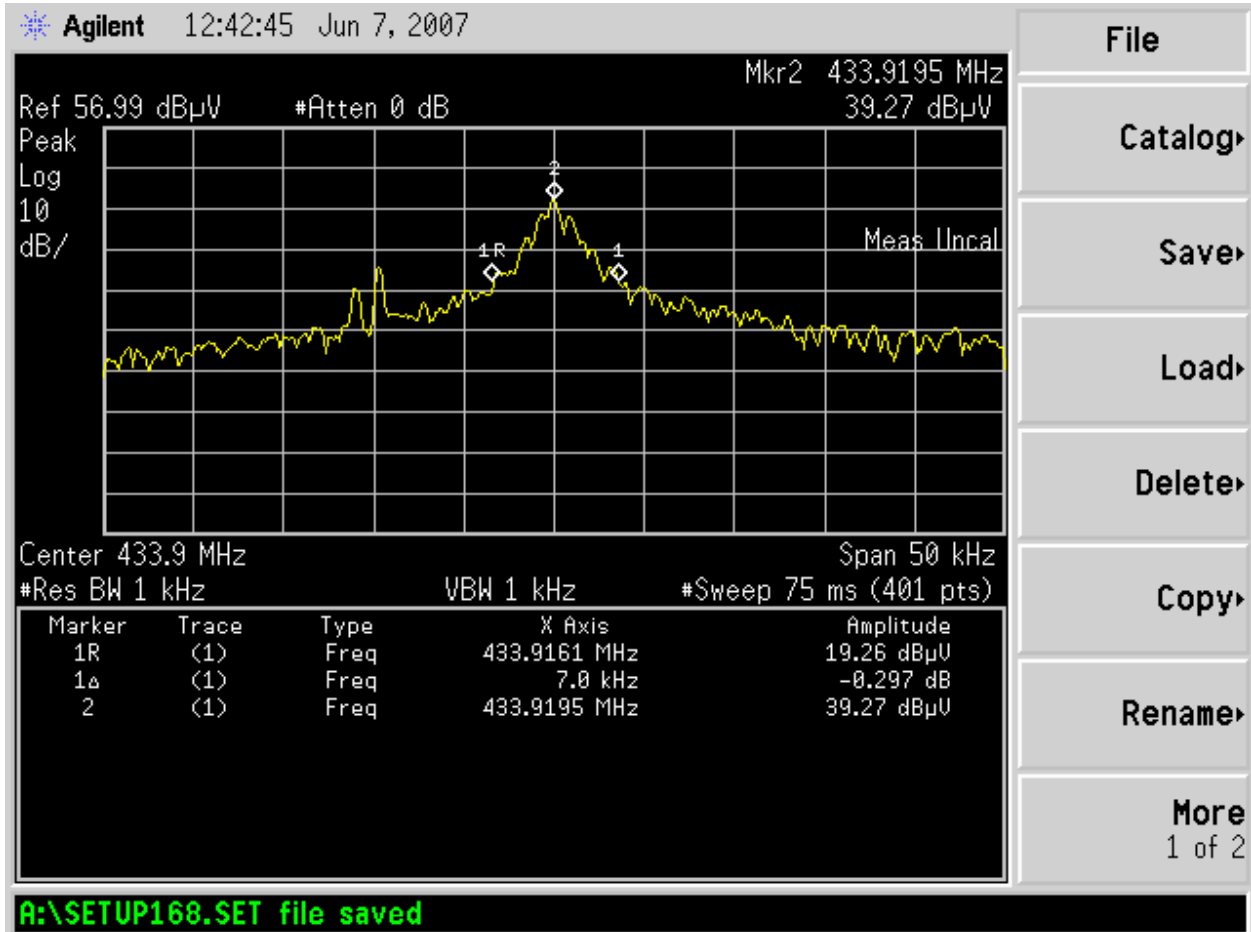
TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	EMI Receiver, 9kHz to 6.5GHz	Hewlett Packard	8546A	3410A00173	07/26/2007
2	EMI Filter	Hewlett Packard	85460A	344800203	07/26/2007
3	ANTENNA	EMCO	3142	9701-1116	12/04/2007
4	3 Meter In floor cable for site 2	ITS	RG214B/U	S2 3M FLR	09/26/2007

**Software Utilized:**

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	2/07/05 Revision

**Test Results:**

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 7.0 kHz at 433.9.



433.9 kHz Fundamental: 7.0 kHz 20 dB Bandwidth



**Test Results:** Pass

**Test Standard:** AS/NZS 4268 8.4 and ETSI EN 300 220-1 8.1

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

**Performance Criterion:**

AS/NZS (Australia only): The fundamental emissions must remain within the band from 433.05 MHz to 434.79 MHz

ETSI: Frequency error or frequency drift is 3 KHz.

**Test Environment:**

Environmental Conditions During Testing:	Humidity (%):	26	Pressure (hPa):	1009	Ambient (°C):	21
Pretest Verification Performed	Yes		Equipment under Test:	M805		

**Test Equipment Used:**

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	4 Line Digital Barometer *	Mannix	0ABA116	SAF311	05/15/2008
2	Spectrum Analyzer	Agilent	E7405A	US40240205	08/16/2007
3	Small Temperature/Humidity Chamber	Bryant Manufacturing	TH-5S	1207	03/30/2008

**Software Utilized:**

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	2/07/05 Revision

**Test Results:**

**Frequency Stability**

Company: Timex Corporation  
 Model #: M805  
 Serial #: ENG690 #2  
 Engineer(s): Vathana Ven  
 Project #: 3124574  
 Standard: AS/NZS 4268, ETSI EN 300 220

Test Equipment Used:  
 AGL001 SAF311  
 SAF187

Location: Safety  
 Date(s): 06/07/07

%	Voltage Volts	Temp Celsius	Frequency MHz	Deviation kHz	Limit kHz	Power	Deviation dB
N/A	2.55	-20	433.91656	2.39	3.00	36.2	-1.3
N/A	3	-20	433.91656	2.39	3.00	36.9	-0.6
N/A	3	+20	433.91895	0	3.00	37.5	0
N/A	3	+55	433.91712	1.83	3.00	37.0	-0.5
N/A	2.55	+55	433.91712	1.83	3.00	37.0	-0.5

AS/NZS Notes: Given the ~7.0 kHz bandwidth at 433.9 kHz measured previously, and the maximum measured frequency drift of 2.39 KHz, 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.

**Test Results:** Pass

**Test Standard:** ETSI EN 300 220-1 8.5

**Test:** Adjacent channel power

**Performance Criterion:**

The adjacent channel power must not exceed 10 uW (-20 dBm).

**Test Environment:**

Environmental Conditions During Testing:	Humidity (%):	26	Pressure (hPa):	1009	Ambient (°C):	21
Pretest Verification Performed	Yes		Equipment under Test:	M805		

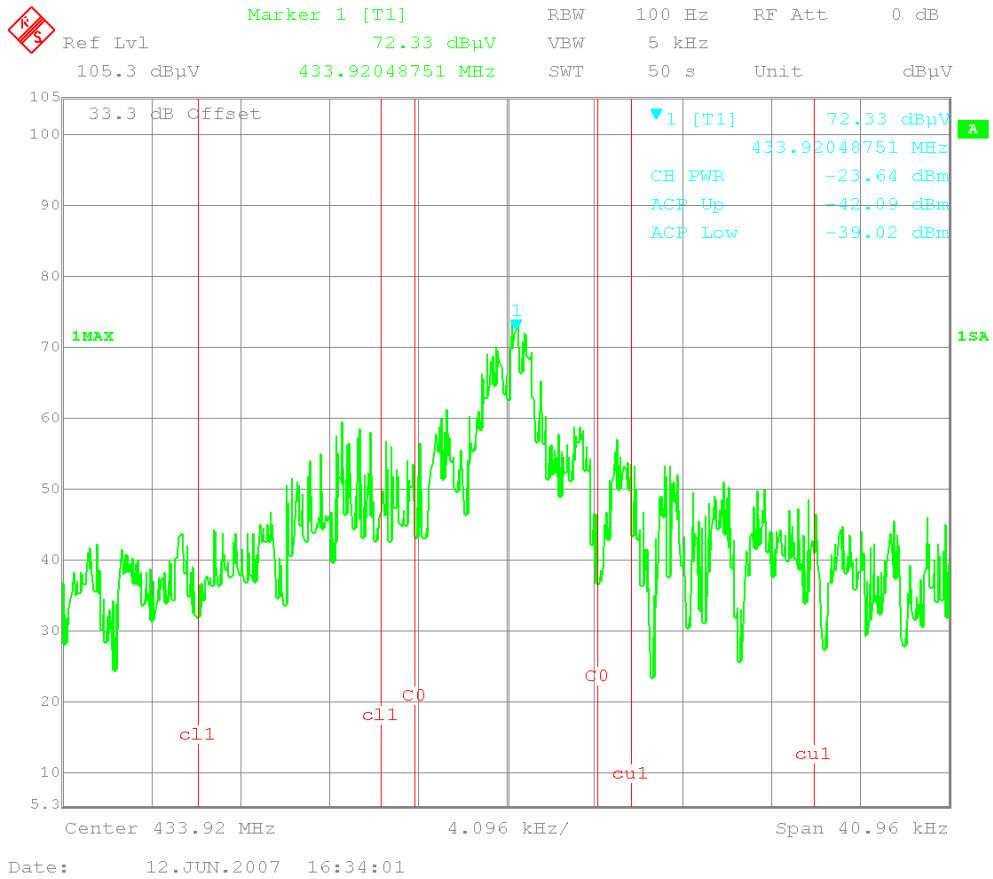
**Test Equipment Used:**

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Digital 4 Line Barometer	Mannix	0ABA116	BAR2	05/20/2008
2	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	10/23/2007
3	ANTENNA	EMCO	3142	9711-1223	02/06/2008
4	3 Meter In floor cable for site 2	ITS	RG214B/U	S2 3M FLR	09/26/2007

**Software Utilized:**

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	2/07/05 Revision

## Test Results:



Notes: Maximum adjacent channel power is -39.02 dBm which is below the limit of -20 dBm.

**Test Results:** Pass

**Test Standard:** Basic Standards from ETSI EN 301 489-1 (2001) and ETSI EN 301 489-3 (2001)

**Test:** ESD

**Performance Criterion:** B

**Test Environment:**

Environmental Conditions During Testing:	Humidity (%):	42	Pressure (hPa):	995	Ambient (°C):	22
Pretest Verification Performed	Yes		Equipment under Test:		M805	

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

**Test Equipment Used:**

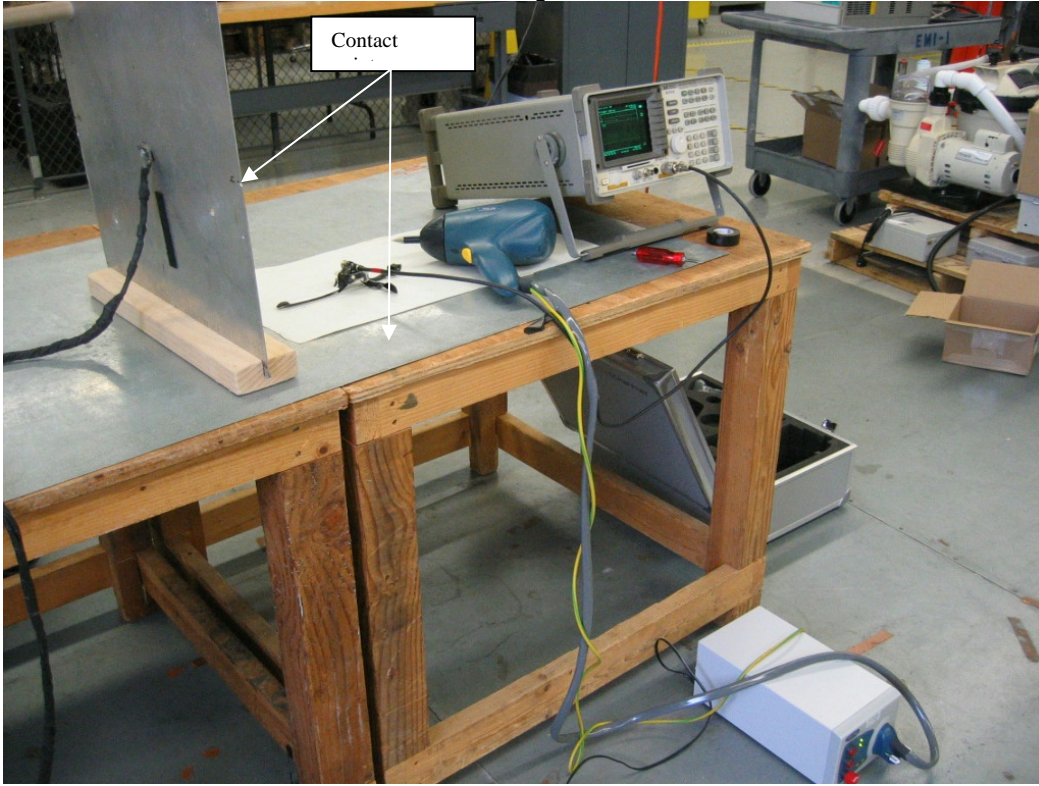
TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Electrostatic Voltmeter	Sensitive Research	ESH	U24187	02/16/2009
2	ESD Test Set	Schaffner	NSG438	557	05/22/2008
3	4 Line Digital Barometer *	Mannix	0ABA116	SAF311	05/15/2008

**Test Details:**

Test Point	Standard Limit (as published)	Compliance Level	Pass Fail N/A	Comment
HCP&VCP	±4kV	±4kV	Pass	
All contact points	±4kV	±4kV	Pass	
All non-conductive surfaces	±8kV	±8kV	Pass	

Notes: See following photos for individual test positions

**ESD Setup Photo**



**ESD Setup photos continued:**



**ESD Setup photos continued:**





**Test Results:** Pass

**Test Standard:** Basic Standards from ETSI EN 301 489-1 (2001) and ETSI EN 301 489-3 (2001)

**Test:** Radiated RF Susceptibility

**Performance Criterion:** A

**Test Environment:**

Environmental Conditions During Testing:	Humidity (%):	63	Pressure (hPa):	985	Ambient (°C):	23
Pretest Verification Performed	Yes		Equipment under Test:		M805	

**Maximum Test Disturbance Parameters:** 80-2000MHz @ 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	Antenna, Log Periodic, 80 - 1000MHz	Amplifier Research	AT1080	15259	Verified
2	Istropic Field Probe	Amplifier Research	FP2000	15398	08/04/2007
3	MICROWAVE HORN ANTENNA	Amplifier Research	AT4002, 1-4.2GHz, 25	21499	Verified
4	Isotropic Field Monitor	Amplifier Research	FM2000	16839	Verified
5	Generator, Signal	Hewlett Packard	8648C	3847A05291	02/15/2008
6	METER, POWER	Hewlett Packard	436A/022	2604A23768	04/19/2008
7	Attenuator, SWITCH DRIVER	Hewlett Packard	11713A	2421A03484	Verified
8	AMPLIFIER; 100W; 200-1000MHz	Kalmus	717FC/1-70-563-002	8053-2	Verified
9	AMPLIFIER; 1kW; 10kHz-200MHz	Kalmus	137C/1-60-105-002	8044-1	Verified
10	4 Line Digital Barometer *	Mannix	0ABA116	SAF311	05/15/2008
11	AMPLIFIER, 50W, .8 - 4.2GHz	Amplifier Research	50S1G4A	29183	Verified
12	Dual Directional Coupler	Amplifier Research	DC7144, .8 - 4.2GHz	28765	11/29/2007

13	Bi Directional Coupler	Werlatone inc.	C3910	5281	03/06/2008
14	COUPLER, BI-DIRECTIONAL	Werlatone inc.	C5960	7727	01/03/2008
15	SENSOR, POWER	Hewlett Packard	8481A	1928A17048	09/19/2007

**Software Utilized:**

Name	Manufacturer	Version
TILE	Quantum Change/EMC Systems, LLC	3.2.L (Small Enclosure)
TILE	Quantum Change/EMC Systems, LLC	3.4.J.2(Large Enclosure)

**Test Details:**

Test Point	Standard Limit (as published)	Compliance Level	Pass Fail N/A	Comment
Front/Rear	3 V/m (h&v)	3 V/m (h&v)	Pass	
Left/Right	3 V/m (h&v)	3 V/m (h&v)	Pass	

Notes:

**Radiated Susceptibility Setup Photo**

