# *Segway*

# *PT SE*

# Report of EMI/EMC Test

Prepared for

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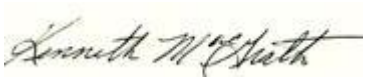
| | |
|---|---|
| **Model Number** | ***PT SE*** |
| **Test Date:** | **October 4, 7-10, 16, & 17, 2013** |
| **Tested & Reviewed By:** | **Ken MacGrath, Manager** |
| **Prepared By:** | **Hilary MacGrath, Administrator** |
| |  |

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# 1.0 Executive Summary

## 1.1 Scope

This document describes electromagnetic emissions and immunity testing performed on the Segway, PT SE, on October 4, 7-10, 16, & 17, 2013 pursuant to EN 61000-6-2 Immunity; EN 55011/EN 55022, and FCC Part 15 Class B Conducted and Radiated Emissions requirements.

## 1.2 Content

Contained within this report are the technical descriptions of the equipment under Test (EUT) as well as the test methods and results used to verify compliance with EN 61000-6-2 Immunity; EN 55011/EN 55022, and FCC Part 15 Class B Conducted and Radiated Emissions requirements.

## 1.3 Conclusions

The Segway, PT SE, met the EN 61000-6-2 Immunity, as well as the EN 55011/55022 and FCC Part 15, Class B Conducted and Radiated Emissions requirements when tested as received.

## 1.4 Test Summary

See *Table 1, Test Summary* on the following page.

## Table 1, EN 55011/EN 55022:2010 Emissions & EN 61000-6-2 Immunity Test Summary

| Status | Environmental Phenomena | | Specification | Units | Basic Standard | Remarks | Criteria |
|---|---|---|---|---|---|---|---|
| P | Radiated Emissions | | 30 – 1000 | MHz | FCC Part 15 & EN55011/EN55022 | Class B | Pass/ Fail |
| P | Conducted Emissions | | 150 – 30 | kHz | FCC Part 15 & EN55011/EN55022 | Class B | Pass/ Fail |
| P | ESD | Contact | ±2,4,6, and 8 | kV | 61000-4-2 | See basic standard for applicability of contact and/or air discharge tests | B |
| | | Air | ±2,4,8, and 15 | | | | |
| P | RF Electromagnetic Field. Amplitude Modulated | | 26 to 80<br>40<br>80 | MHz<br>V/m<br>% AM<br>(1 kHz) | 61000-4-3 | The test level is the r.m.s. value of the unmodulated carrier | A |
| P | Radio-Frequency Electromagnetic Field. Amplitude Modulated | | 80 to 3000<br>40<br>80 | MHz<br>V/m<br>% AM<br>(1 kHz) | 61000-4-3 | The test level specified is the r.m.s. value of the unmodulated carrier | A |
| P | A C | Fast Transients | 0.5, 1, and 2<br>5/50<br>5 | kV (peak)<br>Repetition Freq. kHz | 61000-4-4 | The test level specified is the peak value. | B |
| P | A C | Surges<br>Line-to-Line<br>L-E, N-E | ± 500V, 1kV<br>± 500V, 1kV, 2kV | Tr/Th µs kV (open circuit test voltage) | 61000-4-5 | See clause 5, paragraph 3 | B |
| P | AC | RF Common Mode | 0.15 to 80<br>10<br>80 | MHz<br>V<br>% AM<br>(1 kHz) | 61000-4-6 | The test level is the r.m.s. value of the unmodulated carrier | A |
| P | Power-frequency magnetic field | | 50, 60<br>100 | Hz<br>A/m | 61000-4-8 | The test shall be carried out at the freq. appropriate to the P/S freq. | A |
| P | Voltage Dips<br><br>Each at both:<br>230V 50Hz /<br>120V 60Hz | | 0<br>½<br><br>0<br>1<br><br>40<br>10/12<br><br>70<br>25/30<br><br>80<br>250/300 | % Voltage Cycle<br><br>% Voltage Cycle<br><br>% Voltage Cycles<br><br>% Voltage Cycles<br><br>% Voltage Cycles | 61000-4-11 | Voltage shift at zero crossing | B |
| P | Voltage interruptions<br>At both: 230V 50Hz/120V 60Hz | | 0<br>250/300 | % Voltage Cycles | 61000-4-11 | Voltage shift at zero crossing | C |
| P | Flicker | | 230V/50Hz | V/F | 61000-3-3 | Voltage flicker | P/F |
| P | Harmonics | | 230V/50Hz | V/F | 61000-3-2 | Current harmonics | P/F |

# 2.0 Test Condition

## 2.1 Description of EUT

EUT Model Name: PT SE
EUT Model #: Segway PT SE
Serial Number: N/A

The product family is PT SE, under which there are several models that are electrically identical but have different wheels, fenders, and trim.

- 23444-00001 Model, 2013, Standard
- 23444-00002 Model, 2013, Standard, Patroller
- 23580-00001 Model, 2013, Off-Road
- 23580-00002 Model, 2013, Off-Road, Patroller
- 23580-00003 Model, 2013, Turf
- 23580-00004 Model, 2013, Turf, Patroller

Description: The Segway PT SE is a personal transporter vehicle.

## 2.2 System Operation

The PT SE was configured to exercise in its normal operating state, which in operating mode is with the wheels spinning and in affixed position when in charge mode.

## 2.3 Support Equipment

| Description | Qty | Model | Serial Number |
|---|---|---|---|
| K2 Battery | 1 | K2 Energy | K2D74V6EB |
| Valence Battery | 1 | N/A | V1-0001 |

**Cables**

| Cable Description | Qty | Shielded Yes/No | Length (m) |
|---|---|---|---|
| Power cord | 1 | No | 2 |

## 2.4 Clock List

A clock list of potential sources of emissions is detailed in the table below.

| Clock (kHz) | Clock (MHz) | Location |
|---|---|---|
| 32.768kHz | 4MHz | N/A |
| 100kHz | 8MHz | N/A |
| 132kHz | 10MHz | N/A |
| 200kHz | 16MHz | N/A |
| | 19MHz | N/A |
| | 32MHz | N/A |

## 2.5 Test Facility

The test facility, Core Compliance Testing Services, is at 79 River Road, Hudson, NH 03051. All Radiated testing is performed in an Alternative Open Area Test Site conforming to the site attenuation characteristics defined by ANSI C63.4-2003, MP5 and OST-55. The test facility is listed with the FCC (registration number 792478) and ISO 17025 accredited.

## 2.6 Test Equipment

All equipment used in the testing process has up to date calibrations traceable to the National Institute of Standards and Technology (NIST). Refer to the Table 2 on the following page for a complete list of equipment used during the test.

Test Equipment list is on the following page.

## Table 2: Test Equipment

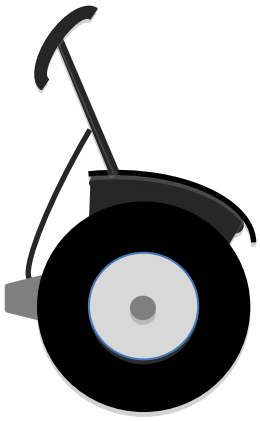
| Asset # | Description | Manufacturer | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|---|
| 4 | LISN | R&S | ESH3-Z5 | 826789/014 | 01/22/12 | 01/22/14 |
| 6 | EMI Receiver | HP | 85462A/85460A | 3942A00506 | 01/23/13 | 01/23/14 |
| 7 | Current Probe | EMCO | 95236-1 | 9901-50320 | 05/25/12 | 05/25/14 |
| 11 | AC Surge Control Unit | Haefely | PSurge 4.1 | 082876-20 | 01/29/13 | 01/29/14 |
| 14 | Capacitor clamp | Keytek | CCL-801 | 01231 | 07/02/12 | 07/02/14 |
| 15 | Antenna Horn | EMCO | 3115 | 9906-5841 | 02/06/13 | 02/06/14 |
| 17 | Antenna | Chase | CBL6112B | 2602 | 11/08/11 | 11/08/13 |
| 18 | Bilog Antenna | Chase | CBL6140 | 1041 | N/A | N/A |
| 21 | Cable, 80 Ft. | Andrew | ETS1-50T | 00A1108341 | 02/06/13 | 02/06/14 |
| 26 | Computer | Dell | Dimension 3000 | CN-0T6952-70821-48T-54NW | N/A | N/A |
| 28 | Amplifier | AR | 100L | 4552 | N/A | N/A |
| 29 | Signal Generator | Marconi Instruments | 2024 | 112282/264 | 05/16/13 | 05/16/14 |
| 30 | Semi-Anechoic chamber | Keene Ray Proof | N/A | 8298 | 03/30/13 | 03/30/14 |
| 34 | Coupling Decoupling Network | Fischer Custom Communications | FCC-801-M3-25 | 136 | 06/20/12 | 06/20/14 |
| 35 | Coupling Decoupling Network | Schaffner | CDN-M3-16 | 99114 | NA | NA |
| 36 | High Power Directional Coupler | Werelatone | C5100 | 6085 | 05/25/12 | 05/25/14 |
| 51,52 | Receiver | Rohde & Schwarz | ESMI | 845364/009 | 12/06/12 | 12/06/13 |
| 62 | Oscilloscope | LaCroy | 9374M | 9374 1088 | 05/17/13 | 05/17/15 |
| 82 | ESD Gun | Schaffner | NSG 435 | 002498 | 05/25/12 | 05/25/14 |
| 83 | Directional Coupler | Werelatone | C3910 | 6565 | 02/17/12 | 02/17/14 |
| 85 | Field Probe Kit | AR | FP7003/FL7006 | 311505/ 0332268 | 12/01/11 | 12/01/13 |
| 86 | Interface | AR | IF7001 | 0328176 | N/A | N/A |
| 88 | Amplifier | AR | 150W1000 | 0332441 | N/A | N/A |
| 87 | Amplifier | AR | 25S1G4A | 0322329 | N/A | N/A |
| 90 | AC Power Supply | Kikusui | PCR4000L | 15100320 | N/A | N/A |
| 93 | Gaussmeter 5170 | F.W. Bell | 5170 | 0941019 | N/A | N/A |
| 95 | Signal Generator | Rohde & Schwarz | SMQ 06B | 100222 | 03/23/12 | 03/23/14 |
| 98 | Power Meter | Agilient/HP | E4419B | GB39290657 | 02/16/12 | 02/16/14 |
| 99B | 51" Magnetic Loop Antenna – Square | Homemade | N/A | N/A | N/A | N/A |

*All equipment used for testing has been calibrated according to methods and procedures defined by the National Institute of Standards and Technology (NIST).*

## 2.7 EUT Setup and Operation

During test the EUT was setup as shown below:

***PT SE***



# 3.0 Test Specification, Methods and Procedures

**Test Specification**

- EN 55011:1998 "Industrial, scientific and medical equipment - Radio-frequency Disturbance Characteristics - Limits and Methods of Measurement"
- EN 55022:1998 "Information technology equipment — Radio disturbance characteristics — Limits and methods of measurement"
- CFR 47 FCC: "Rules and Regulations", Part 15 Radio Frequency Devices", Subpart B: Unintentional Radiators" (2002).
- ANSI C63.4:2003 "American National for Method of Measurement of Radio Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz".
- EN 61000-6-2:2006 Electromagnetic compatibility (EMC) - Generic standards - Immunity for industrial environments
- EN 61000-3-2:2002 Limits – Limits for harmonic current emissions (equipment input current ≤16 A per phase)
- EN 61000-3-3:2000 Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection
- EN 61000-4-2:2008 Testing and measurement techniques – Electrostatic Discharge Immunity Test
- EN 61000-4-3:2006 Testing and measurement techniques – Radiated, Radio-Frequency, Electromagnetic Field Immunity Test
- EN 61000-4-4:2004 Testing and measurement techniques – Electrical Fast Transient/Burst Immunity Test
- EN 61000-4-5:2005 Testing and measurement techniques – Surge immunity test
- EN 61000-4-6:2008 Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields
- EN 61000-4-8:2009 Testing and measurement techniques – Power frequency magnetic field immunity.
- EN 61000-4-11:2004 Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity test.

## 3.1 Immunity Test Performance Criteria

**Requirements for Performance Criteria A:**

***General Performance Criteria:***
The EUT shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the EUT is used as intended.

**Particular Criteria:**
Normal operation indication should be:
- Voice interruptions not allowed during the test.

**Requirements for Performance Criteria B:**

General Performance Criteria:
The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the EUT is used as intended. During the exposure to electromagnetic phenomenon, degradation of performance is allowed.

**Requirements for Performance Criteria C:**

General Performance Criteria:
Loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of controls by the user in accordance with the manufacturer's instructions.

Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

**Particular Criteria:**
EUT voluntary shut off and self-recovery after the test allowed.

# 4.0 Additional Deviations or Exclusions from the Test Specifications

None.

# 5.0 Measurements, Examinations and Test Results

## 5.1 Location of the Test Site

The emissions and immunity test facility, Core Compliance Testing Services, LLC, is located at 79 River Road, Hudson, NH 03051. The tests are done at this facility at one or more of the following test stations:

- Enclosed 10 meter Alternative Test Site
- 3-Meter Semi-Anechoic Chamber
- Workstation #1: 8 x 10 vertical and horizontal ground plane

## 5.2 Initial Check and Functional Test

The Segway, PT SE was received on October 4, 2013 for testing, and was inspected to ensure proper working condition and again before returned for shipment.

The Segway, PT SE passed the incoming inspection when received and was returned to the customer after completion of testing.

## 5.3 Conducted and Radiated Measurement Detector Mode

Initial Radiated Emissions measurements were taken in the Peak Detector Mode, and all final measurements were taken in Quasi-Peak Detector Mode. Initial Conducted Emissions scans were taken in Peak Detector Mode, and all final measurements were taken in Quasi-Peak and Average Detector Mode.

## 5.4 Conducted Emissions Tests Pursuant to EN 55011/EN 55022/FCC Part 15

### Conducted Emissions Terms and Calculation

The following is a description of terms and a sample calculation, as appears in the Conducted Emissions Data Table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

**Reading:** This is the reading obtained on the receiver in dBμV. Any external attenuators used are taken into account through internal analyzer settings.

**Limit:** This is the EN 55011/EN 55022/FCC Class B, Conducted Emission limit (in units of dBμV).

**Margin:** This is the margin of compliance below the EN 55011/EN 55022/FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Below is an example of an emission measuring 55.0 dBμV on the receiver at 5.4 MHz. Note: This example shows a passing result (i.e. a negative margin).

**Example only:**

| Reading | | Average limit | | Margin |
|---|---|---|---|---|
| 45 dBμV | - | 50 dBμV | = | -5 dB |

**Object of Conducted Emissions**

The purpose of this test is to measure the conducted electromagnetic emissions on the AC power lines, pursuant to EN 55011/EN 55022/FCC Class B, requirements.

**Conducted Emissions Test Procedure**

The EUT was tested as described in C63.4 and CISPR 11/CISPR 22. Testing is performed at a workstation with the EUT placed on a 10 cm high stand that is positioned 40 cm from a 2-meter by 2-meter vertical coupling plane. Each individual current-carrying power lead is individually connected through a 50Ω/50μH Line Impedance Stabilization Network (LISN). The EUT is set into operation such that all parts of the system are exercised, while the RF voltages across the 50 Ω measuring port of the LISN are recorded. The test is repeated for each current-carrying power line of the EUT.

**Deviations from Test Method**

None

**3**

**Table 3: Class B Conducted Emissions Limit**

| Frequency (MHz) | EN 55011/EN 55022 FCC Part 15 Quasi-Peak (dBμV) | EN 55011/EN 55022 FCC Part 15 Average (dBμV) |
|---|---|---|
| 0.150 to 0.50 | 66-56 | 56-46 |
| .50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

*Notes: For the table shown above, the stricter limit applies at the frequency transition points.*

**Measurement Uncertainty**

To compensate for the measurement uncertainties, a minimum margin of a 3.6 dB margin is recommended for conducted emissions data to verify passing results.

**Conducted Emissions Test Summary**

| Type | Input Voltage | Frequency | Results |
|---|---|---|---|
| Mains | 120VAC | 60Hz | Passed |
| Mains | 230VAC | 50Hz | Passed |

**Results**

The Segway, PT SE met the Class B Conducted Emissions requirements when tested as described below. (See Table 4 and Table 5 on pages 15 and 17 for the Class B Conducted results.)

*Worst-case emissions measured:*

| Modifications | Class B Conducted Emissions |
|---|---|
| See Note (1) | Passed: -2.2 dB at .211 MHz<br>Line Voltage: 230 VAC 50 Hz<br>See Table: 5 |

Note (1): Final scan. No modifications installed.

*The above results pertain only to the specific item submitted for testing, identified by the product's model and serial numbers.*

***Conducted Emissions Data Tables***

**Table 4**

**FCC & EN55011/EN55022, Class B Conducted Emissions**

Company: Segway
Test Engineer: G. Correia
Model: Personal Transporter, PT SE
Test Date: October 8, 2013
Test Configuration: Charge (K2 battery in back, Valence battery in front)

| Neutral 230VAC 50Hz | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Freq. (MHz)** | **Peak (dB*u*V)** | **Quasi-Peak (dB*u*V)** | **Average (dB*u*V)** | **LISN Factors** | **Limit Quasi-Peak** | **Limit Average** | **Margin (dB)** |
| 0.164 | 55.7 | 47.5 | 37.5 | -0.0800 | 65.3 | 55.3 | -17.7 |
| 0.209 | 62.5 | 60.1 | 50 | -0.1000 | 63.2 | 53.2 | -3.0 |
| 0.314 | 46.9 | 43.8 | 34.5 | -0.1200 | 59.9 | 49.9 | -15.2 |
| 0.421 | 38.5 | 35.1 | 26.4 | -0.1200 | 57.4 | 47.4 | -20.9 |
| 3.149 | 43.9 | 39.6 | 29.1 | -0.1600 | 56.0 | 46.0 | -16.2 |
| 4.27 | 35.5 | 32.4 | 22.8 | -0.2200 | 56.0 | 46.0 | -23.0 |
| 5.125 | 22.5 | 19.9 | 11.8 | -0.2200 | 60.0 | 50.0 | -38.0 |
| 15.197 | 23.9 | 21.9 | 16.2 | -0.4100 | 60.0 | 50.0 | -33.4 |
| | | | | | | | |
| **Line 230VAC 50Hz** | | | | | | | |
| **Freq. (MHz)** | **Peak (dB*u*V)** | **Quasi-Peak (dB*u*V)** | **Average (dB*u*V)** | **LISN Factors** | **Limit Quasi-Peak** | **Limit Average** | **Margin (dB)** |
| 0.187 | 55.8 | 43.9 | 31.9 | -0.07 | 64.2 | 54.2 | -20.2 |
| 0.211 | 62.9 | 60.9 | 50.9 | -0.1 | 63.2 | 53.2 | -2.2 |
| 0.318 | 47.1 | 45.8 | 38.3 | -0.12 | 59.8 | 49.8 | -11.3 |
| 0.423 | 40.7 | 37.2 | 29.2 | -0.12 | 57.4 | 47.4 | -18.1 |
| 3.198 | 46.1 | 42.1 | 31.5 | -0.18 | 56.0 | 46.0 | -13.7 |
| 4.272 | 39.1 | 32.9 | 23.1 | -0.24 | 56.0 | 46.0 | -22.7 |
| 5.135 | 25.2 | 21.2 | 12.1 | -0.24 | 60.0 | 50.0 | -37.7 |
| 15.771 | 21.1 | 18.4 | 12.3 | -0.43 | 60.0 | 50.0 | -37.3 |

***Conducted Emissions Plots***

**Plot 1**

**Mains: 230VAC/50Hz –Line**

## Table 5

## FCC & EN55011/EN55022, Class B Conducted Emissions

Segway
Test Engineer: G. Correia
Model: Personal Transporter, PT SE
Test Date: October 8, 2013
Test Configuration: Charge (K2 battery in back, Valence battery in front)

| Neutral 120VAC 60Hz | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Freq. (MHz)** | **Peak (dB*u*V)** | **Quasi-Peak (dB*u*V)** | **Average (dB*u*V)** | **LISN Factors** | **Limit Quasi-Peak** | **Limit Average** | **Margin (dB)** |
| 0.157 | 62.3 | 60.1 | 46.4 | -0.07 | 65.6 | 55.6 | -5.5 |
| 0.21 | 54.7 | 52.8 | 44.8 | -0.1 | 63.2 | 53.2 | -8.3 |
| 0.314 | 45.2 | 41.2 | 28.8 | -0.12 | 59.9 | 49.9 | -18.5 |
| 0.424 | 41.8 | 36.8 | 21.4 | -0.12 | 57.4 | 47.4 | -20.4 |
| 2.942 | 47.2 | 42.7 | 31.4 | -0.18 | 56.0 | 46.0 | -13.1 |
| 4.103 | 44.7 | 38.3 | 27.7 | -0.24 | 56.0 | 46.0 | -17.5 |
| 5.151 | 26.7 | 23.9 | 14.4 | -0.24 | 60.0 | 50.0 | -35.4 |
| 15.274 | 25.7 | 23.1 | 18.6 | -0.43 | 60.0 | 50.0 | -31.0 |
| | | | | | | | |
| **Line 120VAC 60Hz** | | | | | | | |
| **Freq. (MHz)** | **Peak (dB*u*V)** | **Quasi-Peak (dB*u*V)** | **Average (dB*u*V)** | **LISN Factors** | **Limit Quasi-Peak** | **Limit Average** | **Margin (dB)** |
| 0.157 | 62.2 | 60.7 | 47.2 | -0.07 | 65.6 | 55.6 | -4.9 |
| 0.211 | 55.9 | 53.7 | 45.7 | -0.1 | 63.2 | 53.2 | -7.4 |
| 0.313 | 50.4 | 40.5 | 28.8 | -0.12 | 59.9 | 49.9 | -19.3 |
| 0.425 | 44.9 | 33.7 | 23.1 | -0.12 | 57.3 | 47.3 | -23.5 |
| 3.108 | 51.1 | 43.5 | 33.4 | -0.18 | 56.0 | 46.0 | -12.3 |
| 4.229 | 41.2 | 38.1 | 28.8 | -0.24 | 56.0 | 46.0 | -17.0 |
| 5.008 | 29.3 | 25.8 | 16.8 | -0.24 | 60.0 | 50.0 | -33.0 |
| 15.126 | 26.1 | 24.1 | 19.2 | -0.43 | 60.0 | 50.0 | -30.4 |

**Plot 2**

**Mains: 120VAC/60Hz – Line**

## 5.5 Radiated Emission Test Pursuant to FCC and EN 55011/EN 55022

### Object

The purpose of this test is to measure the radiated electromagnetic emissions generated by the equipment under test (EUT), pursuant to EN55011/EN55022/ FCC Part 15, Group 1, Class B requirements.

### Test Procedure

Testing is performed in an Open Area Test Site. The EUT is placed on a 10cm height stand. The EUT is centered laterally on the turntable.

With the EUT set into operation, the turntable is rotated over 360 degrees. The receiving antenna is placed at a test distance of 3 or 10 meters from the closest point on the EUT. The antenna height is varied from 1 to 4 meters, and the polarity of the antenna is switched between vertical and horizontal such that the received signal is maximized.

### Deviations from Test Method

None.

### Measurement Uncertainty

A minimum of a 5.1 dB margin of compliance is recommended for radiated emissions data to verify passing results. This is recommended to compensate for the measurement uncertainties involved.

**Results**

The Segway, PT SE, met the FCC Part 15 and EN 55011/EN 55022 Radiated Emissions requirements (See page 23 and 24, for the *FCC Part 15 and EN55011/EN55022, Class B Radiated Emissions* test results*)*.

Worst-case emissions measured:

| Modifications | FCC & EN 55011/EN 55022, Class B Radiated Emissions |
|---|---|
| See Note (1) | Passed: -5.0 dB at 312 MHz<br>Line Voltage: 230 VAC, 50 Hz<br>Test Configuration: Charge Mode<br>Internal Battery location: K2 in the back, Valence in the front<br>Polarity: Vertical<br>See Table: 7 |

Note (1): None.

The above results pertain only to the specific item submitted for testing, identified by the product's model and serial numbers.

**Modifications**

None.

**Radiated Emissions Terms and Calculation**

The following is a description of terms and a sample calculation, as it appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document.

**Reading:** This is the reading from the receiver in dBµV. Any external preamplifiers used are taken into account through internal analyzer settings.

**A.F.:** This is the antenna factor. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the receiver and is a loss in dB (cable loss have been included with the A.F. to simplify these calculations). The antenna factor is used in calculations as follows:

*Reading on Receiver (dBµV) + A.F. (dB) = Net field strength (dBµV/m)*

**Net**: This is the net field strength measurement.

**Limit:** This is the radiated emission limit in units of dBµV/m.

**Margin**: This is the margin of compliance below the limit with units given in dB. A negative margin indicates the emission was below the limit.

**Example:**

| Freq. | Reading | AF | Net | Limit | Margin |
|---|---|---|---|---|---|
| 100 | 25.5 | 5.0 | 30.5 | 40.0 | - 9.5 |

***Radiated Emissions Limits***

**Table 6: Class B, Radiated Emissions Limit @ 10 Meters**

| Frequency (MHz) | Bandwidth (kHz) | 10m Group 1, Class B Quasi-Peak Detector |
|---|---|---|
| 30 - 230 | 120 | 30.0 dBµV/m |
| 230 -1000 | 120 | 37.0 dBµV/m |

***Radiated Emissions Data Tables***

**Table 7**

**FCC & EN55011/EN55022 Class B Radiated Emissions**

Company: Segway
Test Engineer: G. Correia
Model: Personal Transporter, PT SE
Test Date: October 8, 2013
Test Configuration: Charge Mode
Internal Battery location: K2 in the back, Valence in the front
Voltage: 230VAC, 50Hz

| Pol. (V or H) | Azimuth/ Height | Freq. (MHz) | Q.P. 10 m Reading (dB*u*V) | Cable Loss (dB) | A.F. (dB) | Net (dB*u*V/m) | FCC Class B Limit @10m (dB*u*V/m) | FCC Margin (dB) | EN55011/ EN55022,VCCI AS/NZS 3548 Class B Limit 10m (dB*u*V/m) | EN55011/ EN55022,VCCI AS/NZS 3548 Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| Vpk | 315/1.0 | 73.7 | 13.5 | 1.0 | 6.6 | 21.1 | 33.0 | -11.9 | 30.0 | -8.9 |
| V | 270/1.0 | 120.0 | 9.3 | 1.3 | 12.1 | 22.7 | 33.0 | -10.3 | 30.0 | -7.3 |
| V | 315/2.1 | 144.0 | 11.8 | 1.4 | 10.8 | 24.0 | 33.0 | -9.0 | 30.0 | -6.0 |
| V | 315/1.0 | 160.0 | 6.3 | 1.4 | 10.0 | 17.7 | 33.0 | -15.3 | 30.0 | -12.3 |
| V | 90/1.0 | 168.0 | 10.0 | 1.5 | 9.7 | 21.2 | 33.0 | -11.8 | 30.0 | -8.8 |
| V | 90/1.0 | 192.0 | 10.4 | 1.6 | 9.2 | 21.2 | 33.0 | -11.8 | 30.0 | -8.8 |
| V | 90/1.0 | 216.0 | 12.3 | 1.6 | 8.8 | 22.7 | 33.0 | -10.3 | 30.0 | -7.3 |
| V | 270/1.5 | 240.0 | 16.8 | 1.7 | 11.4 | 29.9 | 35.5 | -5.6 | 37.0 | -7.1 |
| V | 90/1.0 | 264.0 | 12.0 | 1.8 | 13.8 | 27.6 | 35.5 | -7.9 | 37.0 | -9.4 |
| V | 270/1.0 | 288.0 | 14.7 | 1.9 | 13.2 | 29.8 | 35.5 | -5.7 | 37.0 | -7.2 |
| V | 270/1.4 | 312.0 | 16.7 | 2.0 | 13.3 | 32.0 | 35.5 | -3.5 | 37.0 | -5.0 |
| V | 270/1.0 | 336.0 | 9.3 | 2.1 | 13.4 | 24.8 | 35.5 | -10.7 | 37.0 | -12.2 |
| V | 225/1.0 | 360.0 | 8.7 | 2.1 | 14.9 | 25.7 | 35.5 | -9.8 | 37.0 | -11.3 |

Notes: Scanned 30-1000MHz. Used pre-scan to identify test frequencies.

## Table 8

## FCC & EN55011/EN55022 Class B Radiated Emissions

Company: Segway
Test Engineer: G. Correia
Model: Personal Transporter, PT SE
Test Date: October 8, 2013
Test Configuration: Operating Mode (battery powered)
Internal Battery location: K2 in the back, Valence in the front

| Pol. (V or H) | Azimuth/ Height | Freq. (MHz) | Q.P. 10 m Reading (dB*u*V) | Cable Loss (dB) | A.F. (dB) | Net (dB*u*V/m) | FCC Class B Limit@10m (dB*u*V/m) | FCC Margin (dB) | EN55011/ EN55022,VCCI AS/NZS 3548 Class B Limit 10m (dB*u*V/m) | EN55011/ EN55022, VCCI AS/NZS 3548 Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| Vpk | 135/1.0 | 80.0 | 13.0 | 1.1 | 7.2 | 21.3 | 33.0 | -11.7 | 30.0 | -8.7 |
| V | 270/1.0 | 120.0 | 9.5 | 1.3 | 12.1 | 22.9 | 33.0 | -10.1 | 30.0 | -7.1 |
| V | 315/2.2 | 144.0 | 10.9 | 1.4 | 10.8 | 23.1 | 33.0 | -9.9 | 30.0 | -6.9 |
| V | 315/1.0 | 160.0 | 12.6 | 1.4 | 10.0 | 24.0 | 33.0 | -9.0 | 30.0 | -6.0 |
| V | 45/1.0 | 216.0 | 10.7 | 1.6 | 8.8 | 21.1 | 33.0 | -11.9 | 30.0 | -8.9 |
| V | 225/1.0 | 240.0 | 17.1 | 1.7 | 11.4 | 30.2 | 35.5 | -5.3 | 37.0 | -6.8 |
| V | 0/1.0 | 264.0 | 12.2 | 1.8 | 13.8 | 27.8 | 35.5 | -7.7 | 37.0 | -9.2 |
| V | 270/1.0 | 288.0 | 14.4 | 1.9 | 13.2 | 29.5 | 35.5 | -6.0 | 37.0 | -7.5 |
| V | 270/1.0 | 312.0 | 16.3 | 2.0 | 13.3 | 31.6 | 35.5 | -3.9 | 37.0 | -5.4 |
| V | 225/1.0 | 360.0 | 8.7 | 2.1 | 14.9 | 25.7 | 35.5 | -9.8 | 37.0 | -11.3 |

Notes: Scanned 30-1000MHz. Used pre-scan to identify test frequencies.

## 5.6 Electrostatic Discharge (ESD) Pursuant to EN 61000-4-2

### Object

The purpose of this test is to evaluate the performance of the EUT when subjected to electrostatic discharges of maximum ± 8 kV using the direct contact method and maximum ± 15 kV using the air method.

### Test Procedure

Testing is performed on a reference ground plane. The EUT and its interface cables are isolated from the ground plane by a distance of 10 cm. Positive and negative discharges are made to all surfaces of the EUT, which are normally accessible to the operator. At least four test points are selected for each side. The voltage level is initially set at 2 kV and increased to a maximum of 8 kV for contact discharges, and a maximum of 15 kV for air discharges. To simulate discharges made in close proximity to the EUT, contact discharges are made to the vertical coupling plane around all four sides of the EUT.

### Test Equipment

The following test equipment was used for this test: Asset 62, 82, and 94.

### Climatic Conditions

| | Requirement | Measured |
|---|---|---|
| Ambient Temperature | 15° C to 35° C | 18.4° C |
| Humidity | 30% to 60% | 59% |
| Pressure | 86 kPa to 106 kPa | 102.1 kPa |

### Results

The Segway, PT SE met Performance Criterion B requirements for EN 61000-4-2 with up to a ± 8 kV direct discharge and a ± 15 kV air discharge applied (Note: Product passed test levels of ± 8kV contact and ±15kV air discharge). The Segway FOB was also tested and was found only to meet Criteria C. The FOB display would blank when direct contact discharges between ± 4kV and ± 8kV were applied to the FOB metal buttons. Instructions in the user manual tell the user how to reset the display in the event this occurs. Note that no change of operation, operating parameters, or of stored data occurs.

*See Appendix A on page 55 for ESD test notes/data.*

## 5.7 Radiated Electromagnetic Immunity Pursuant to EN 61000-4-3

### Object

The purpose of performing this test is to determine if the EUT is affected by electromagnetic radiation. The radiation is frequency generated by sources such as hand-held radio transceivers that are used and operated by maintenance and security personnel, fixed station radio and television transmitters, and various industrial electromagnetic sources.

### Procedure

The EUT is placed in the center of the enclosure on a wooden table (if tabletop equipment), while a broadband transmitting antenna is placed 3 meters away. The EUT support equipment is placed outside of the shielded enclosure. Cable connections from inside to outside of the enclosure are made through an access hole in the shielded enclosure.

The frequency is then swept across the entire range of interest at the required field strength while monitoring the EUT performance. The sweep is repeated for both horizontal and vertical polarizations of the antenna and again for all four sides of the EUT.

### Test Equipment

The following test equipment was used for this test: Asset 88, 95, 83, 78, 30, 18, and 40.

### Climatic Conditions

| | Requirement | Measured |
|---|---|---|
| Ambient Temperature | None specified in standard | 21.4° - 24.6° C |
| Humidity | None specified in standard | 45 - 54% |

### Results

The Segway, PT SE met Performance Criterion A requirements for EN 61000-4-3 at 40 V/m from 26 MHz to 3000 MHz with 80% AM at 1 kHz.

## 5.8 Electrical Fast Transient Pursuant to EN 61000-4-4

### Object

The purpose of this test is to evaluate the performance of the EUT when subjected to electrical fast transients of ± 0.5, ± 1.0, and ± 2.0 kV on the power lines.

### Procedure

Testing is performed on a reference ground plane. The EUT and its interface cables are isolated from the ground plane by a distance of 0.1 meters (see Section 2.7 on page 9). The interference signal is coupled to the power lines through an internal capacitive coupling network in the interference generator. The transients are applied to the power lines at the test levels in several coupling configurations including L1, L2, Earth Ground, L1 and Earth Ground, L2 and Earth Ground, and L1, L2, and Earth Ground, while monitoring the EUT performance. Transients are applied for a minimum of one minute for each test configuration.

Testing of the EUT was performed at workstation 2.

### Test Equipment

The following test equipment was used for this test: Asset 14, 62, and 97.

### Climatic Conditions

| | Requirement | Measured |
|---|---|---|
| Ambient Temperature | 15° C to 35° C | 20.8° C |
| Humidity | 25% to 75% | 45% |
| Pressure | 86 kPa to 106 kPa | 103.2 kPa |

### Results

The Segway, PT SE met the Performance Criterion B requirement for EN 61000-4-4 with ± 0.5, ± 1.0, and ± 2.0 kV applied to the AC power lines.

## 5.9 Lightning Surge Pursuant to EN 61000-4-5

### Object

The purpose of this test is to evaluate the performance of the EUT when subjected to ± 1 kV and ± 2 kV surges.

### Procedure

The EUT is connected to the lightning surge generator as shown in Section 2.7 on page 9. The unidirectional lightning surges are applied to each of the AC power lines and ground in various coupling configurations at a 1.2 x 50 µsec open circuit voltage (8 x 20 µ sec short circuit current) waveform. The surges are applied phase to neutral (differential mode), phase to earth ground (common mode), and neutral to earth ground (common mode). The surges are applied at both positive and negative polarities for AC power phase angles of 0, 90, 180, and 270 degrees. Five surges are applied in each coupling configuration with a maximum duration of 1 minute between surges.

Support equipment was located adjacent to the testing station.

### Test Equipment

The following test equipment was used for this test: Asset 11, 54, and 62.

### Climatic Conditions

The climatic conditions must comply with certain requirements during testing and were measured as follows:

| | Requirement | Measured |
|---|---|---|
| Ambient Temperature | 15° C to 35° C | 21.3° F |
| Humidity | 10% to 75% | 45% |
| Pressure | 86 kPa to 106 kPa | 102.6 kPa |

### Results

The Segway, PT SE met Performance Criterion B requirements of EN 61000-4-5 with ± 0.5 kV, ± 1 kV, and ± 2 kV surges applied.

## 5.10 Conducted Disturbances Induced by RF Fields Pursuant To EN 61000-4-6

### Object

The purpose of this test is to evaluate the performance of the EUT when subjected to conducted disturbances induced by an electric field of 10 Vrms from 150 kHz to 80 MHz with 80% AM at 1 kHz.

### Procedure

The EUT is placed over a ground plane (10cm spacing) with the power lines connected through a CDN (Section 2.7, page 10. Starting from the power cord, a pre-calibrated RF level is injected into the line (via the CDN). The frequency is then swept while the RF output is maintained according to the calibration levels. If an error is detected, the sweep is halted; the field strength is reduced until the EUT recovers, and then increased until the EUT errors again. This threshold as well as frequency and behavior of the EUT is noted before continuing.

### Test Equipment

The following test equipment was used for this test: Asset 7, 26, 28, 29, 34, 36, and 98.

### Climatic Conditions

The climatic conditions were measured as follows:

| | Requirement | Measured |
|---|---|---|
| Ambient Temperature | None specified in standard | 19.6° C |
| Humidity | None specified in standard | 50% |
| Pressure | None specified in standard | 102.8 kPa |

### Results

The Segway, PT SE met Performance Criterion A requirement for EN 61000-4-6 at 10 Vrms from 150 kHz to 80 MHz with 80% AM at 1 kHz, when tested as received.

## 5.11 Voltage Variations, Dips, and Interruptions Pursuant to EN 61000-4-11

### Object

The purpose of this test is to evaluate the performance of the EUT when subjected to voltage dips interruptions and variations pursuant to EN 61000-4-11.

### Procedure

Testing is performed with the EUT powered by a controlled voltage source. The source voltage to the EUT is varied and interrupted according to the test specification while being monitored.

### Test Equipment

The following test equipment was used for this test: 9 and 90.

### Climatic conditions

The climatic conditions must comply with certain requirements during testing and were measured as follows:

| | Requirement | Measured |
|---|---|---|
| Ambient Temperature | 15° C to 35° C | 21.0° C |
| Humidity | 25% to 75% | 48% |

### Results

The Segway, PT SE met the Performance Criteria A requirement for EN 61000-4-11 when tested as received.

## 5.12 Current Harmonics and Voltage Fluctuations Pursuant to EN 61000-3-2 and EN 61000-3-3

### Object

The purpose of this test is to evaluate the performance of the EUT for current harmonics and voltage fluctuations (flicker) pursuant to EN 61000-3-2 and EN 61000-3-3.

### Procedure

Testing is performed with the EUT powered by a controlled voltage source. The EUT is turned on, and set into normal operation. The current harmonics and voltage fluctuations from the EUT are then measured according to the test specification.

### Test Equipment

The following test equipment was used for this test: Asset 105 and 106.

### Climatic Conditions

The climatic conditions must comply with certain requirements during testing and were measured as follows:

| | Requirement | Measured |
|---|---|---|
| Ambient Temperature | 15° C to 35° C | 21.6° C |
| Humidity | 25% to 75% | 52% |
| Pressure | 86 kPa to 106 kPa | 103.2 kPa |

### Results

The Segway, PT SE met the requirements of EN 61000-3-2 and EN 61000-3-2 with a current harmonic and voltage flicker distortion of less than 3%.

*See Addendum A on page 59 for the Flicker and Harmonic test results.*

***Photographs***

# SEGWAY

## PT SE


Segway PT SE Front

# SEGWAY

# PT SE


Segway PT SE Rear

# SEGWAY

# PT SE


Segway PT SE Side

# SEGWAY

# PT SE


K2 Battery top

# SEGWAY

# PT SE

K2 Battery bottom

# SEGWAY

# PT SE


Valence Battery top

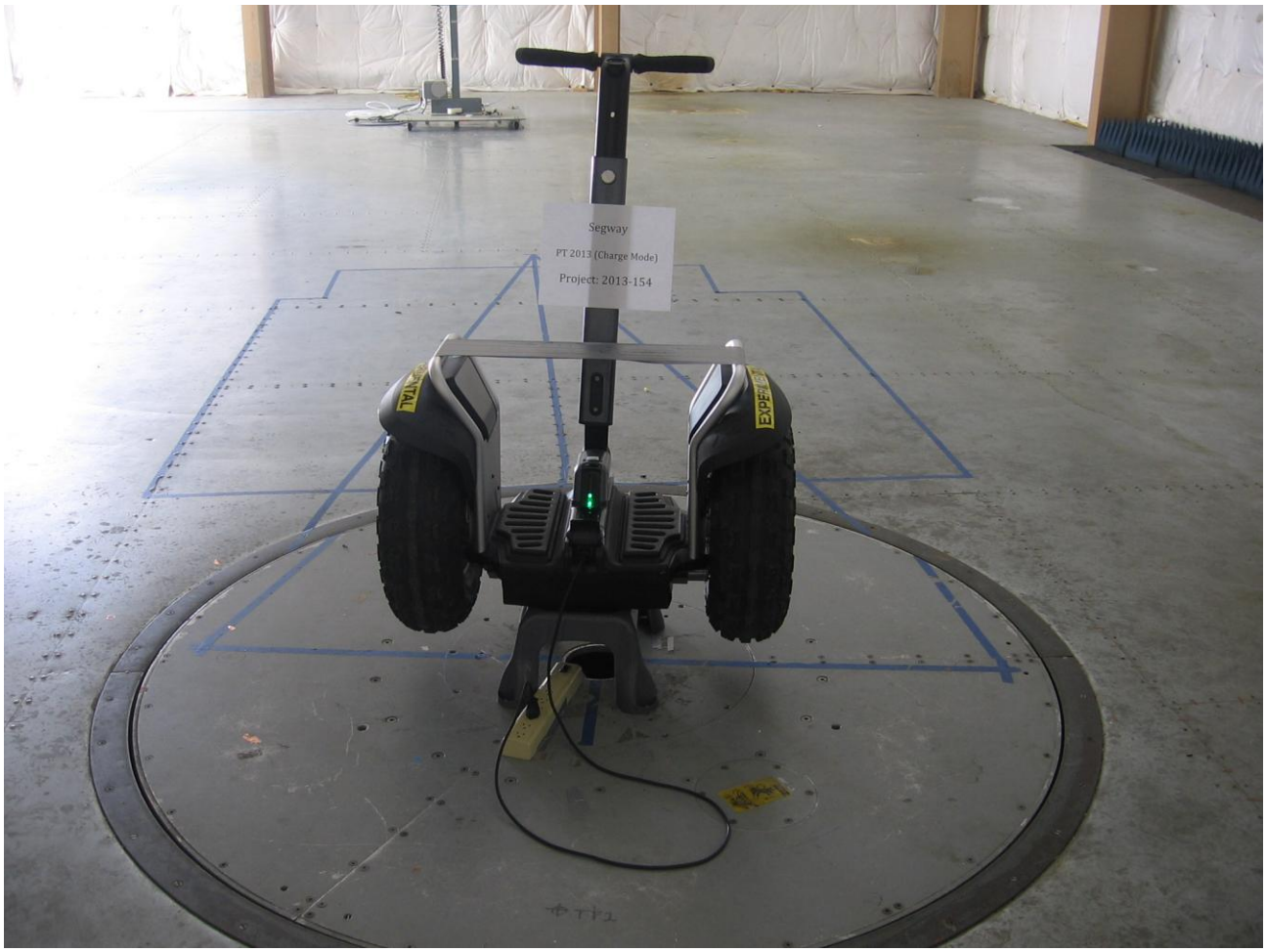
# SEGWAY

# PT SE

Valence Battery bottom

# SEGWAY

# PT SE




## Radiated Emissions Front (Charge Mode)

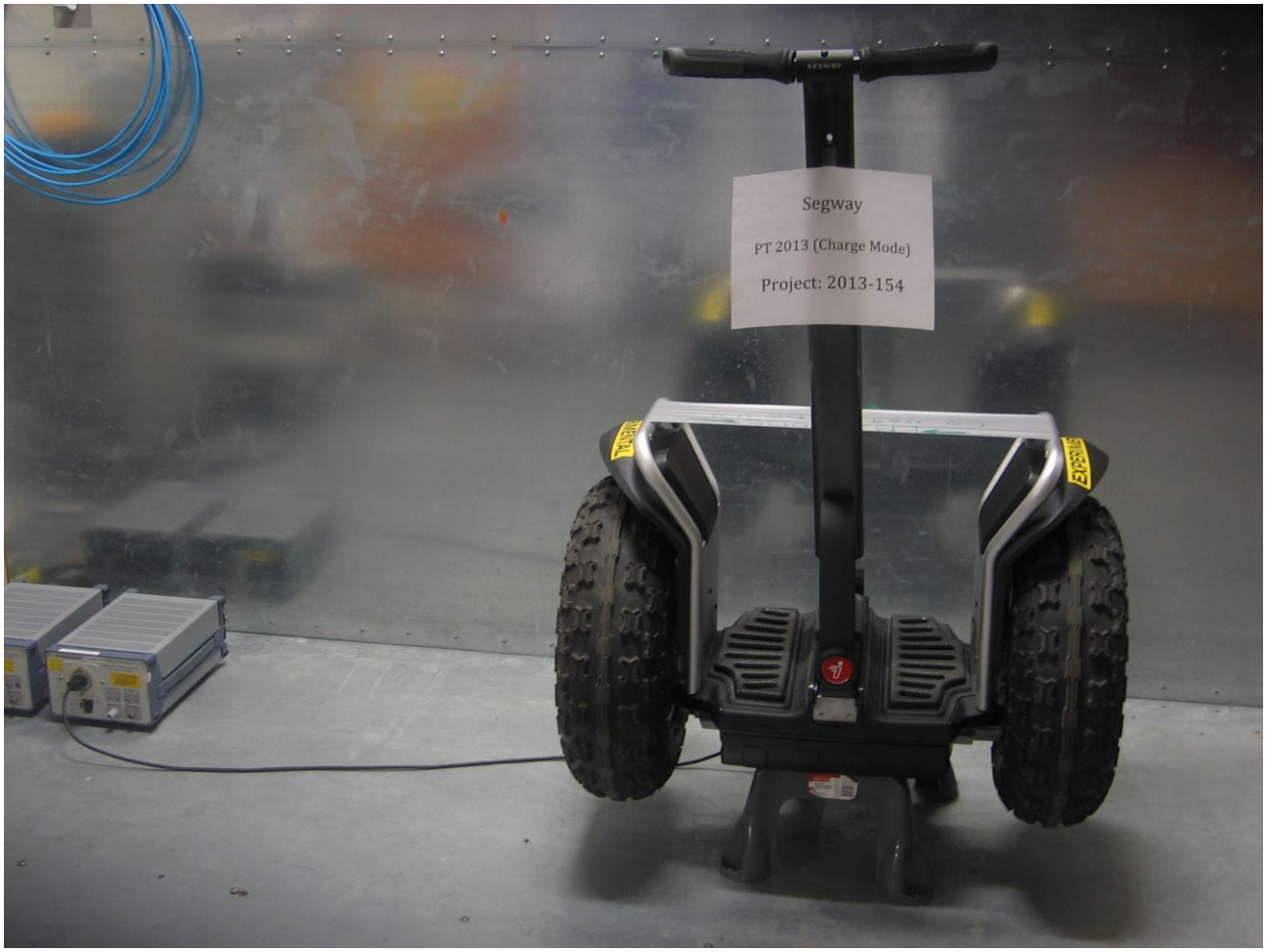
# SEGWAY

# PT SE


## Radiated Emissions (Operating mode)

# SEGWAY

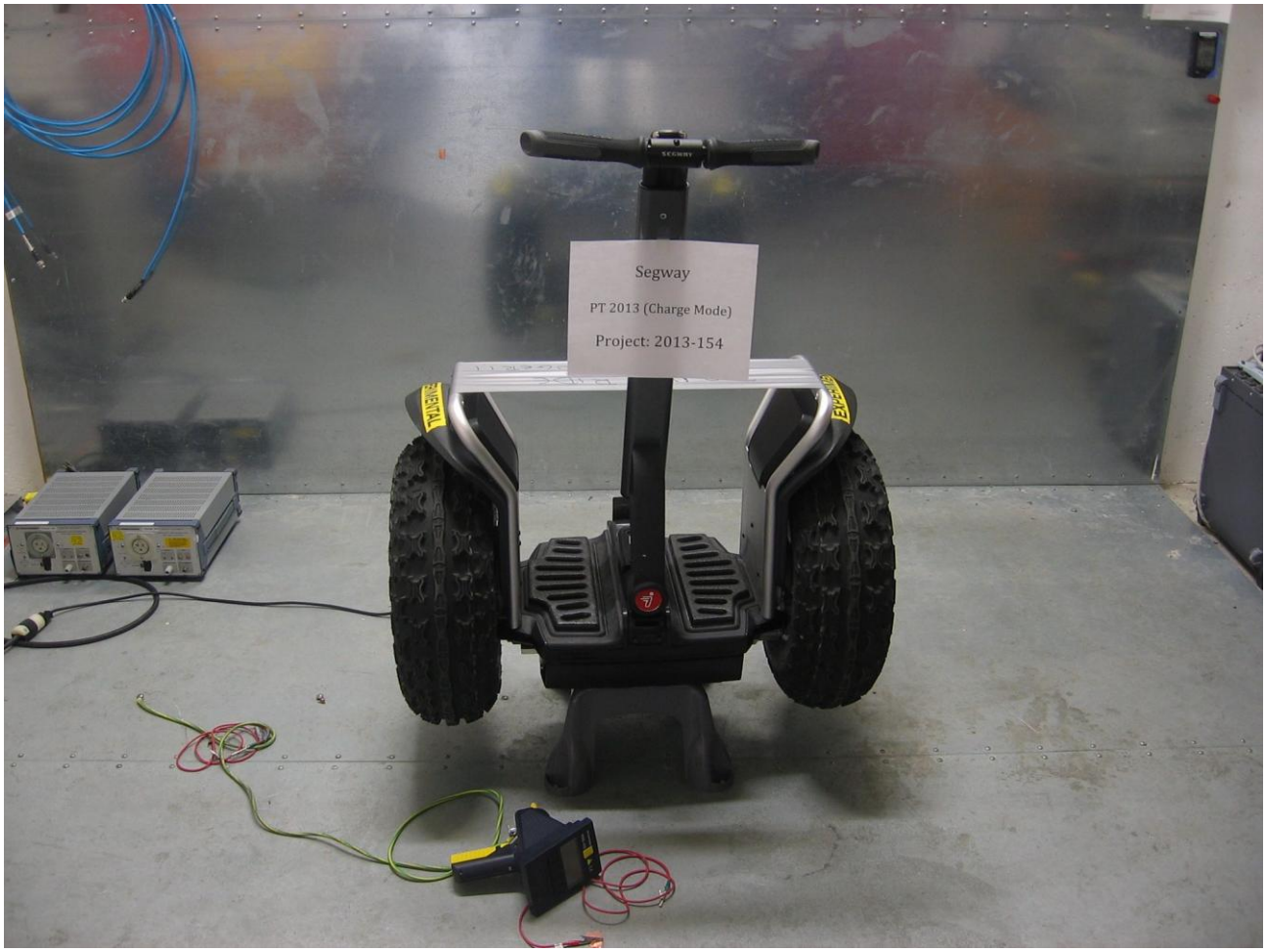
# PT SE




## Conducted Emissions Front (Charge Mode only)

# SEGWAY

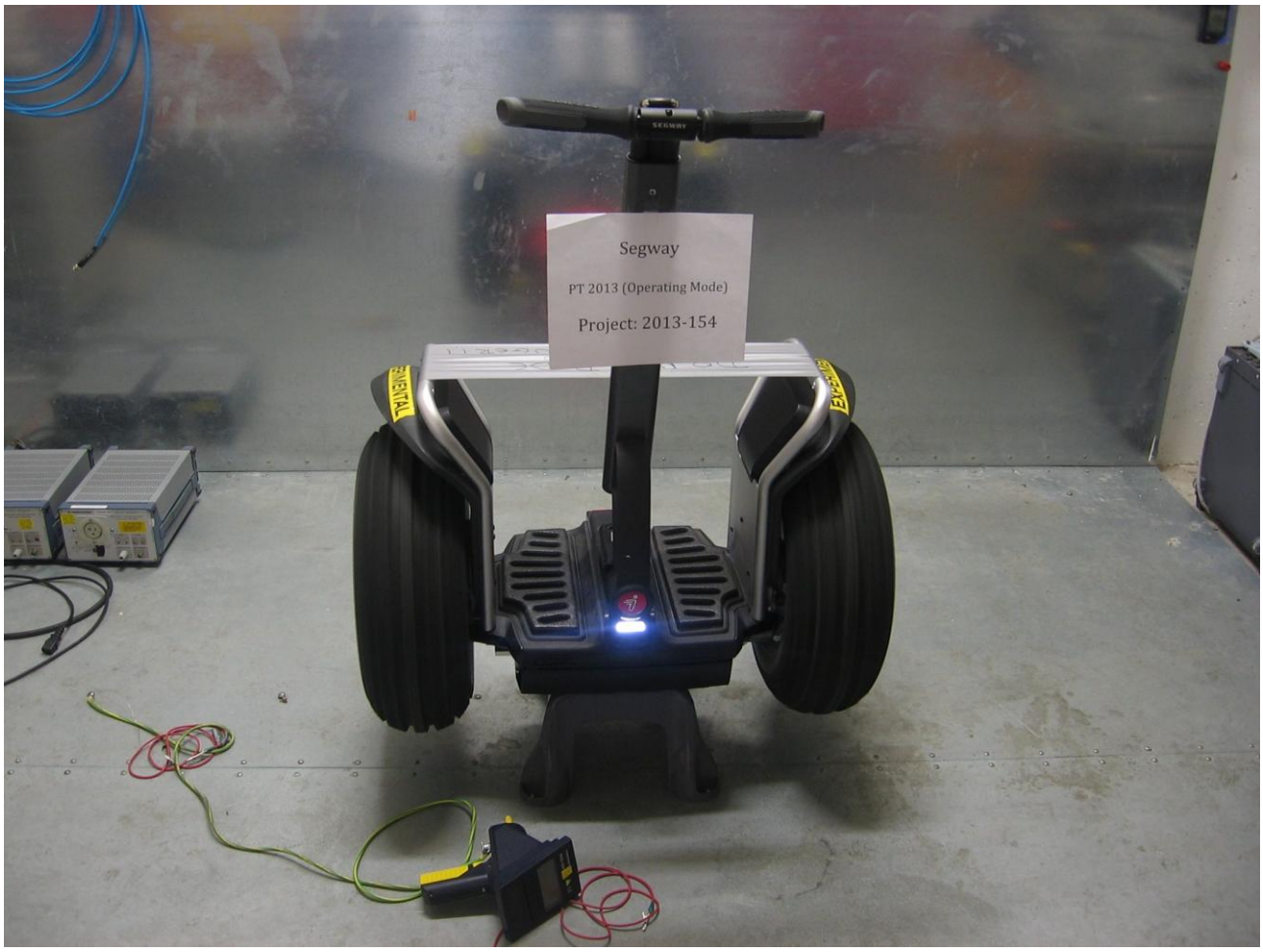
# PT SE




## Electrostatic Discharge (Charge)

# SEGWAY

# PT SE




## Electrostatic Discharge (Operating mode)

# SEGWAY

# PT SE

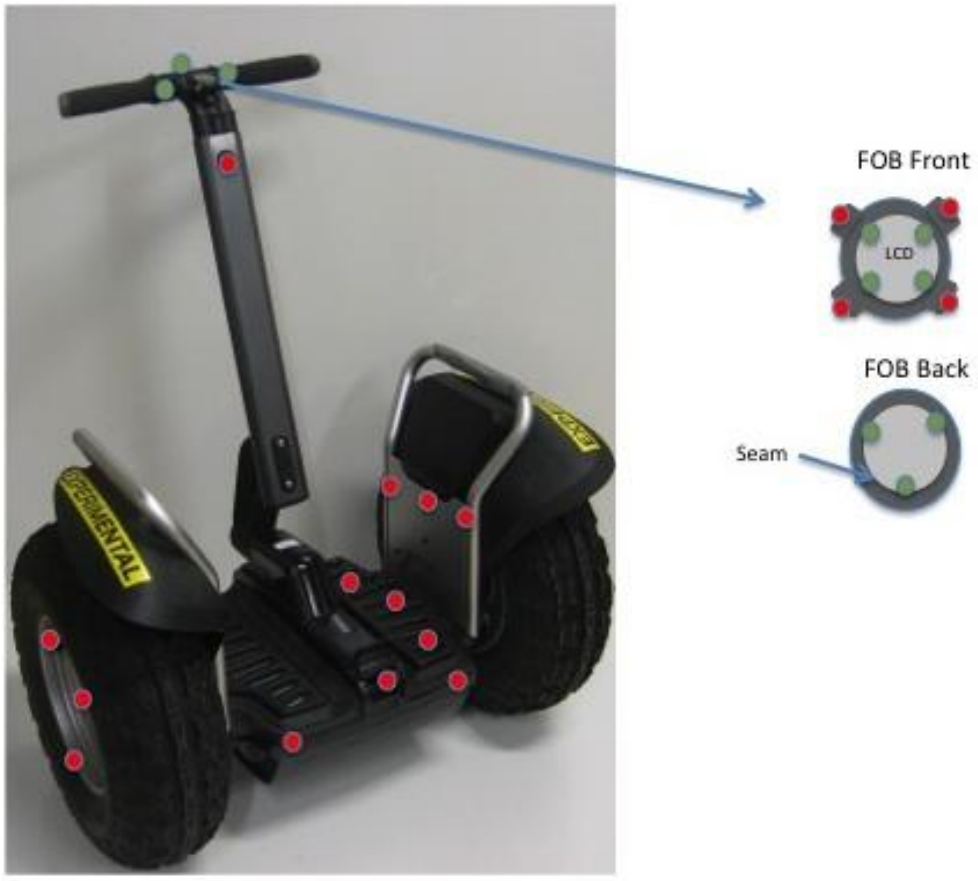

ESD (points of discharge front)

# SEGWAY

# PT SE

Back View – Note: Direct discharges applied to both rims, foot plates, and inside fender walls.

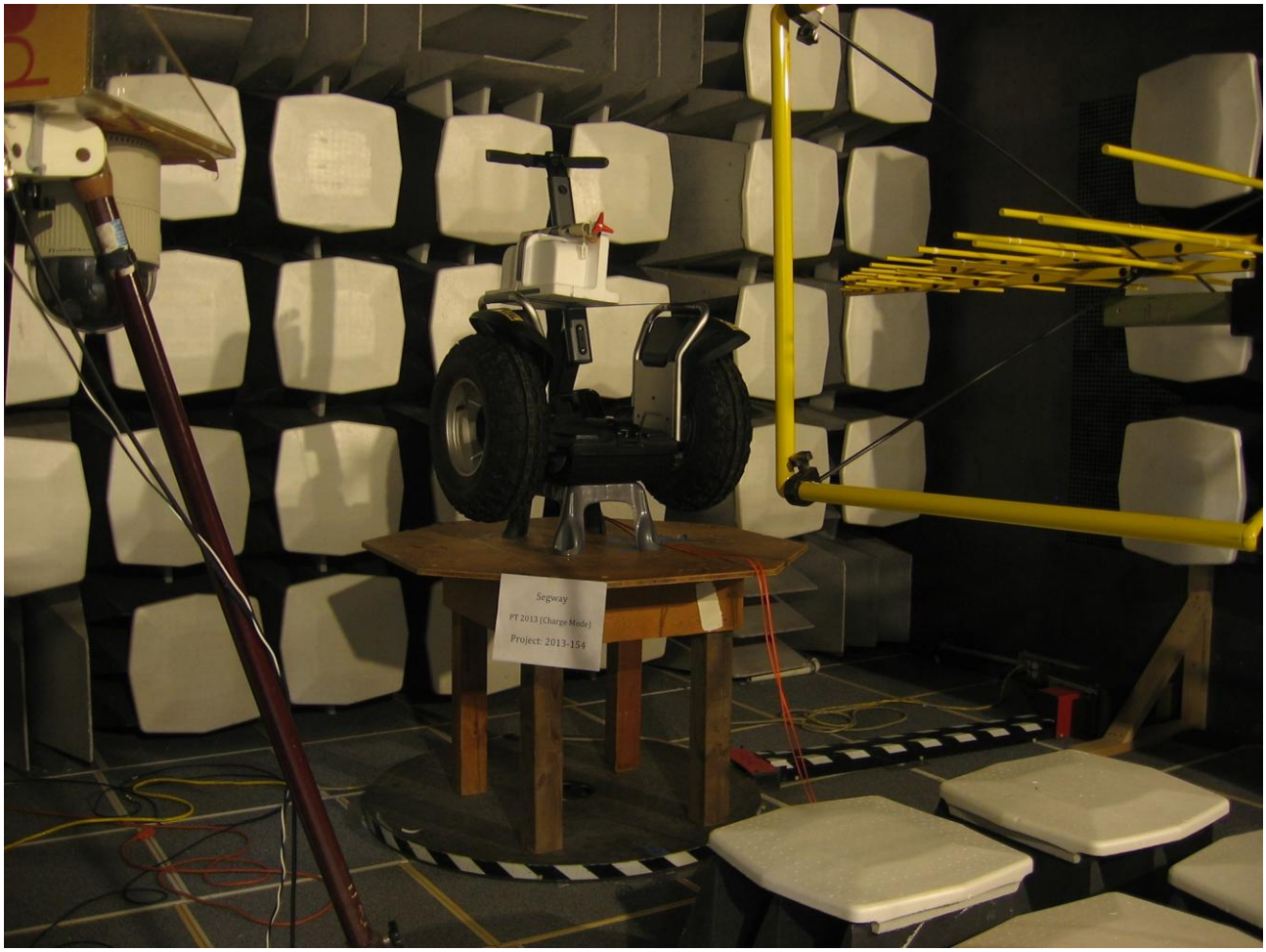
Red indicates direct discharge, green indicates air discharge




## ESD (points of discharge back)

# SEGWAY

# PT SE




## Radiated Frequency Immunity (Charge Mode)

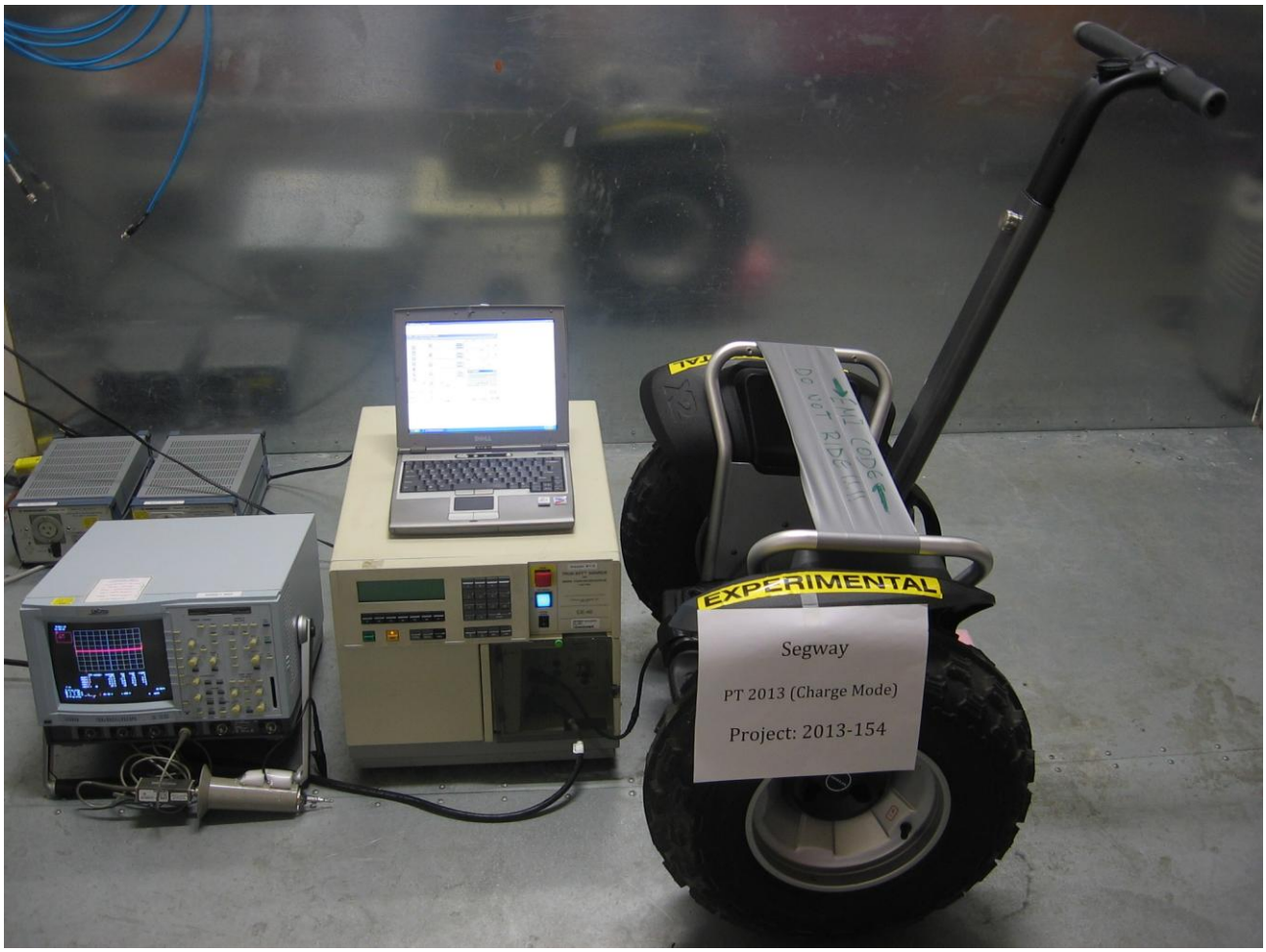
# SEGWAY

# PT SE


## Radiated Frequency Immunity (Operating Mode)

# SEGWAY

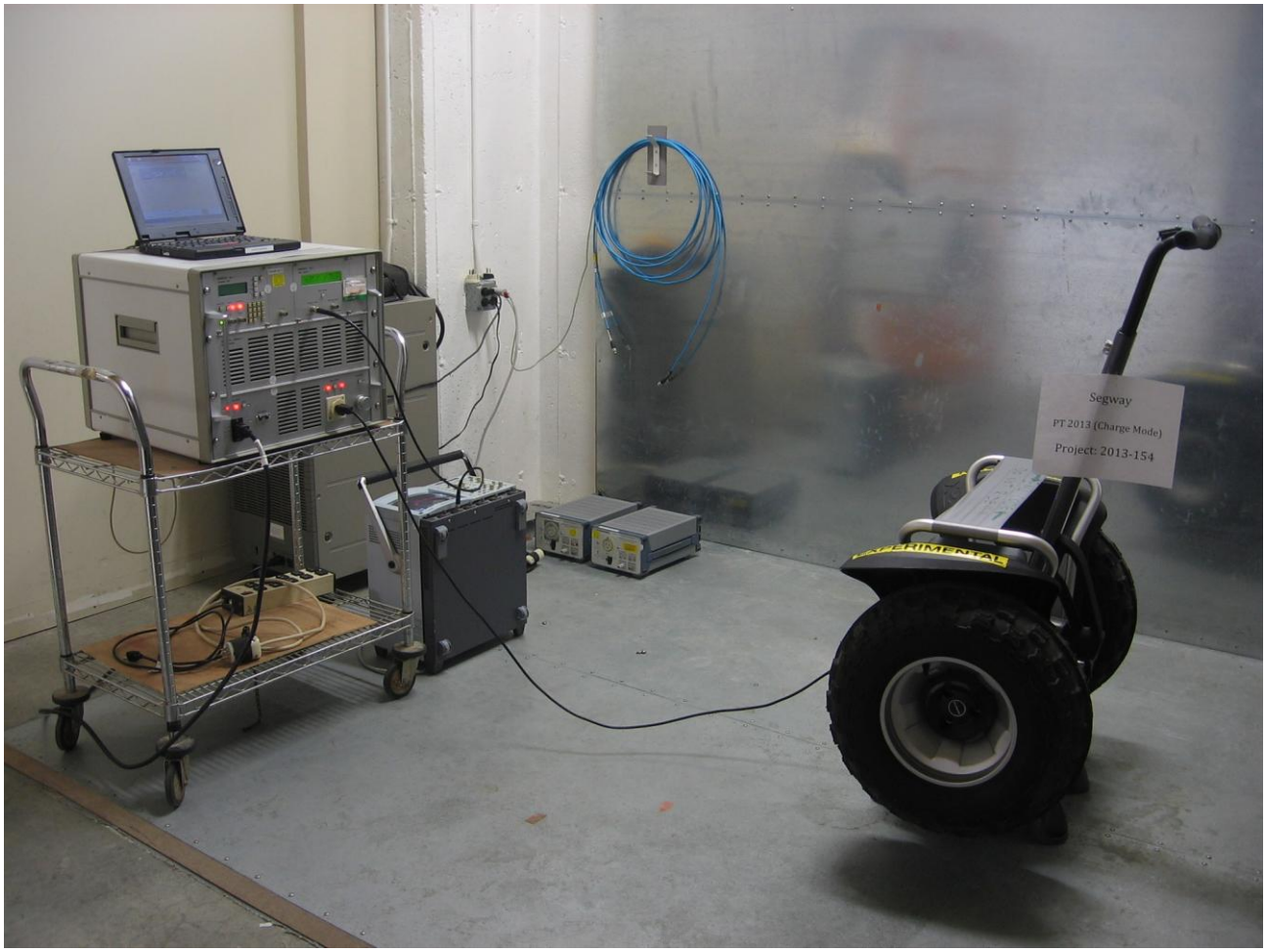
# PT SE




## Electrical Fast Transient (Charge Mode only)

# SEGWAY

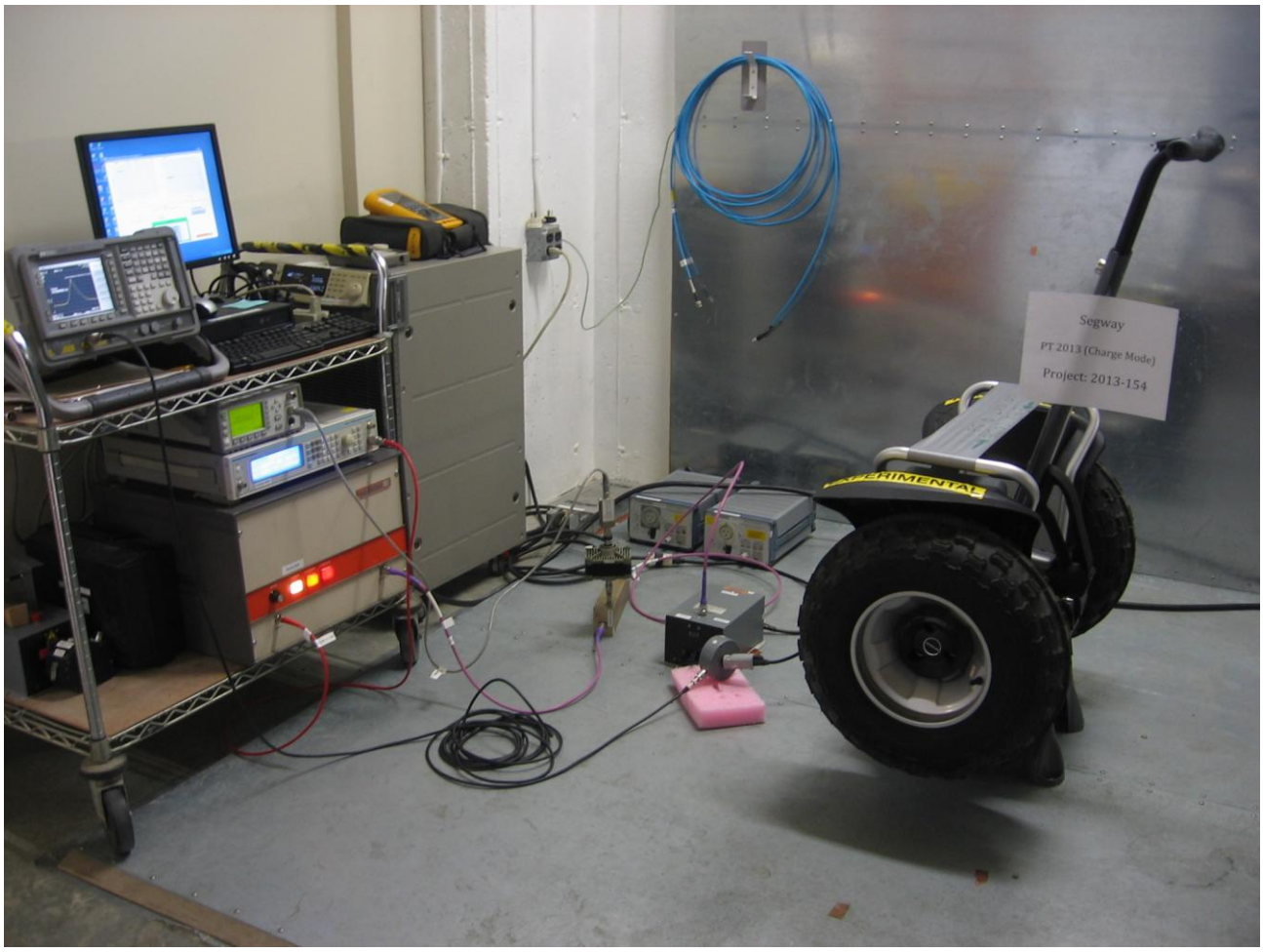
# PT SE




## Surge (Charge Mode only)

# SEGWAY

# PT SE




## Conducted Immunity (Charge Mode only)

# SEGWAY

# PT SE


## Magnetics (Charge Mode)

# SEGWAY

# PT SE


## Magnetics (Operating)

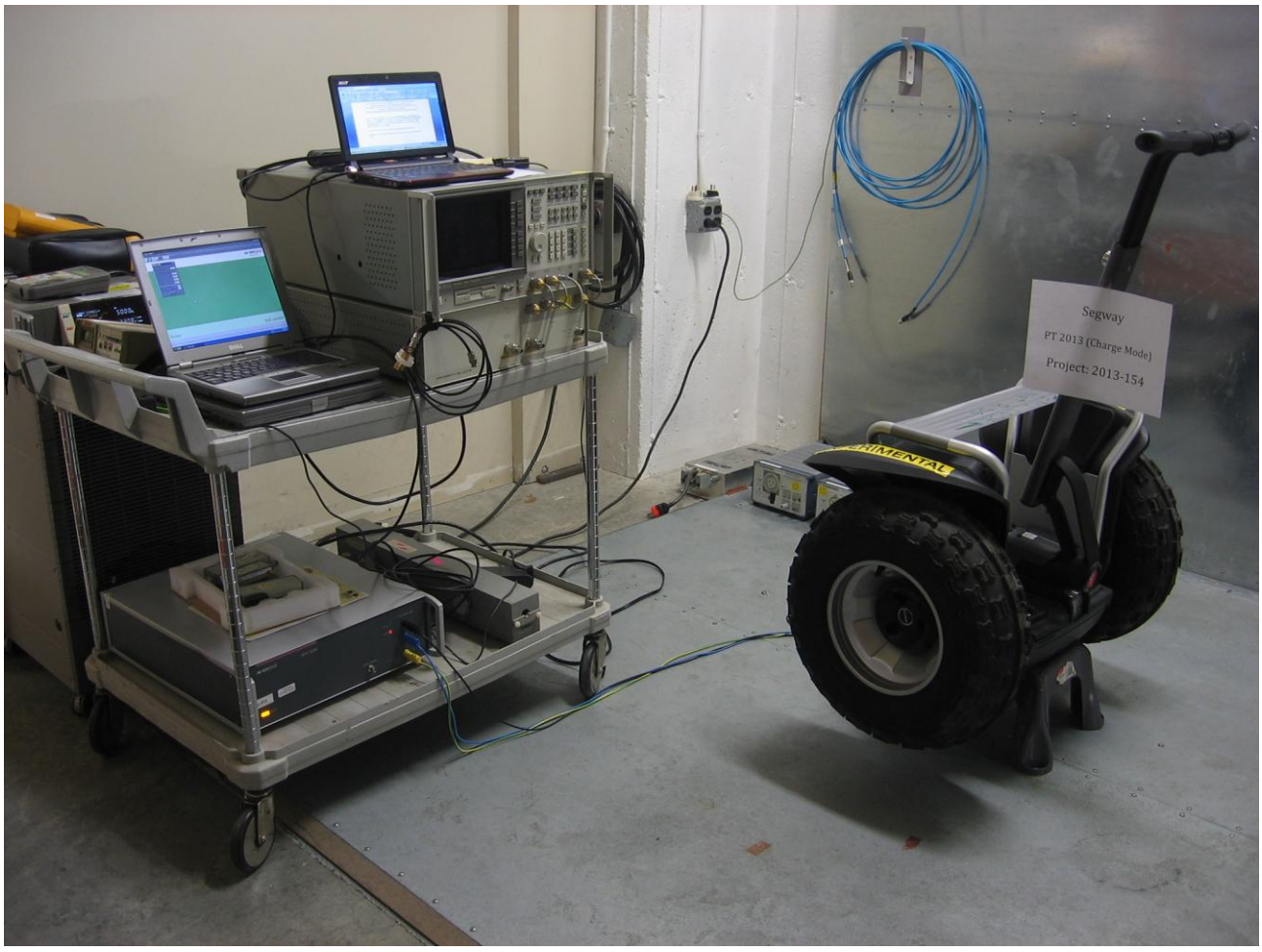
# SEGWAY

# PT SE


## Dips and Interrupts (Charge Mode only)

# SEGWAY

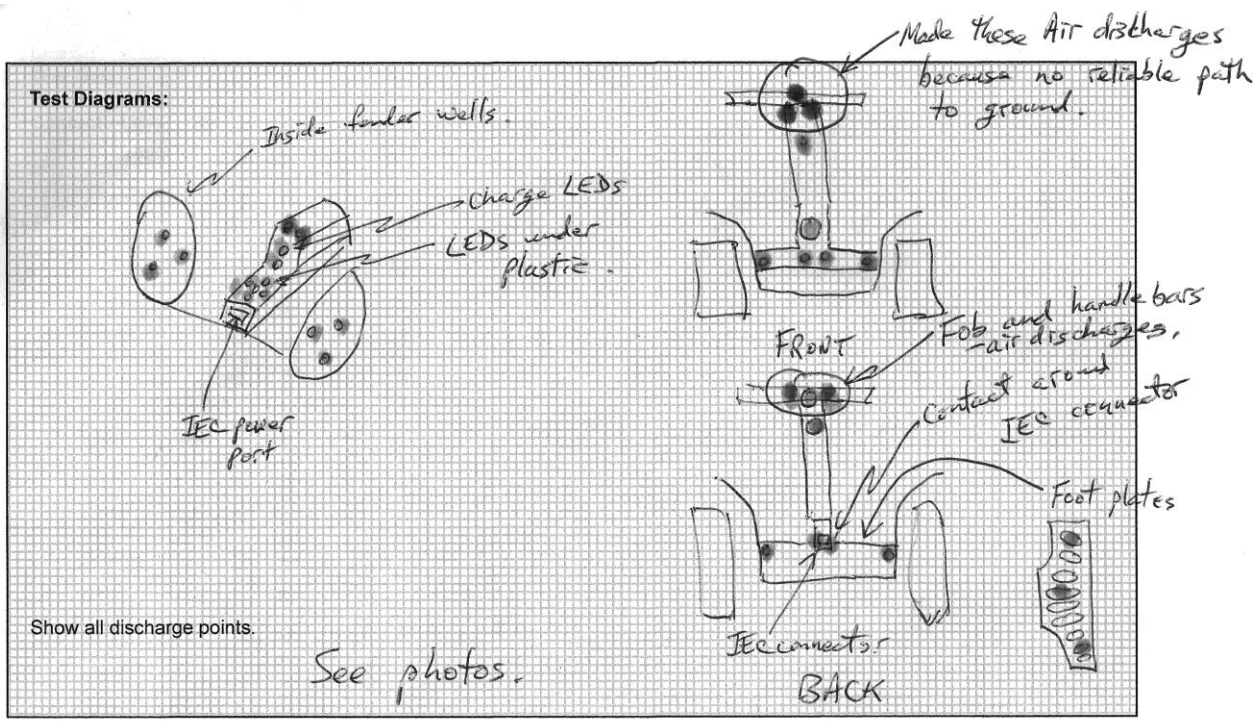
# PT SE




## Flicker and Harmonics (Charge Mode only)

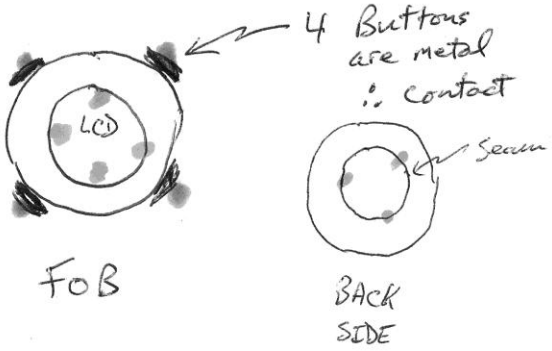
# Addendum A

*ESD Notes*


Test Diagrams:
Inside fender wells.
Charge LEDs
LEDs under plastic.
IEC power port
Show all discharge points.
See photos.
Make these Air discharges because no reliable path to ground.
FRONT
Fob and handle bars - air discharges.
Contact around IEC connector
Foot plates
IEC connector
BACK

Contact

Air


4 Buttons are metal ∴ contact
LCD
Seam
FOB
BACK SIDE

√ = Pass Operating  X = Pass Charge mode

**Test Data:**

**Contact - Level: Required: Completed:**

| Level | Required | Completed |
|---|---|---|
| +2kV | ☑ ☒ | ☑ ☒ |
| -2kV | ☑ ☒ | ☑ ☒ |
| +4kV | ☑ ☒ | ☑ ☒ |
| -4kV | ☑ ☒ | ☑ ☒ |
| +6kV | ☑ ☒ | ☑ ☒ |
| -6kV | ☑ ☒ | ☑ ☒ |
| ±8kV | ☑ ☒ | ☑ ☒ |

270 discharges per Voltage level.

270/1890

**Air - Level: Required: Completed:**

| Level | Required | Completed |
|---|---|---|
| +2kV | ☑ ☒ | ☑ ☒ |
| -2kV | ☑ ☒ | ☑ ☒ |
| +4kV | ☑ ☒ | ☑ ☒ |
| -4kV | ☑ ☒ | ☑ ☒ |
| +8 ~~+6kV~~ | ☑ ☒ | ☑ ☒ |
| -8 ~~-6kV~~ | ☑ ☒ | ☑ ☒ |
| +15 ~~+8kV~~ | ☑ ☒ | ☑ ☒ |
| -15 ~~-8kV~~ | ☑ ☒ | ☑ ☒ |

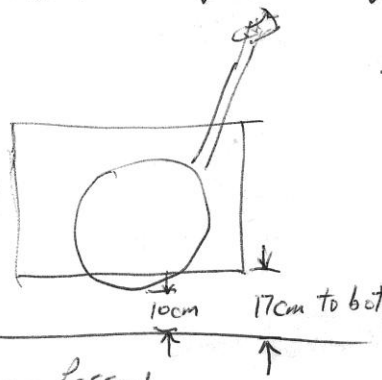
VCP

| | FRONT | RIGHT | REAR | LEFT |
|---|---|---|---|---|
| ± 2kV | √ X | √ X | √ X | √ X |
| ± 4kV | √ X | √ X | √ X | √ X |
| ± 6kV | √ X | √ X | √ X | √ X |
| ± 8kV | √ X | √ X | √ X | √ X |

Passed VCP Operating + charge

FOB Operating Mode

| Contact | Air |
|---|---|
| ±2kV √ | √ |
| ±4kV ~~√~~ * | √ |
| ±6kV ~~√~~ * | √ VCP |
| ±8kV ~~√~~ * | √ |
| ±15kV √ | |




FOB Air Discharge Passed.
* FOB Contact Discharge – See Test/EUT Observations.

**Overall Results:** ☑ * PASS ☐ FAIL * except for FOB – see below.

**Test / EUT Observations:** * FOB Contact discharge – between ±4kV and ±8kV the FOB would blank except for the odometer (or speedometer) whichever was being displayed before it blanked. - Segway to determine if this is a failure of Criteria B. 203PT continued to run even though the FOB blanked.

**Photos Taken:** Yes.

**Items for Follow-Up:** FOB would blank when the test level was swiped away using the 1Meg cable to ground. Sometimes it also blanked during the contact discharge.

**Test Results Reviewed & Approved By, Date:** [ | ]

# Addendum B

## *Flicker and Harmonics Test Report*

| | |
|---|---|
| Report title: | Harmonics and Flicker |
| Company Name: | Segway |
| Date of test: | 5:49 28.Jun 2005 |
| Tester: | GC |
| Standard used: | EN/IEC 61000-3-3 Flicker |
| Short time (Pst): | 10 min |
| Observation time: | 120 min (12 Flicker measurements) |
| Flickermeter: | 230V / 50Hz |
| Flicker Impedance: | Zref (IEC 60725) |
| Customer: | |
| E. U. T.: | PT SE |
| | 230VAC, 50Hz |

| | |
|---|---|
| Test Result | PASS |

| | | | |
|---|---|---|---|
| (Date) | | (Sign) | |

# Maximum Flicker results

| | EUT values | Limit | Result |
|---|---|---|---|
| Pst | 0.234 | 1.00 | PASS |
| Plt | 0.113 | 0.65 | PASS |
| dc [%] | 0.033 | 3.30 | PASS |
| dmax [%] | 0.195 | 4.00 | PASS |
| dt [s] | 0.000 | 0.50 | PASS |

## Detail Flicker data

| Flicker measurement 1 | EUT values | Limit | Result |
|---|---|---|---|
| Pst | 0.058 | 1.00 | PASS |
| dc [%] | 0.000 | 3.30 | PASS |
| dmax [%] | 0.087 | 4.00 | PASS |
| dt [s] | 0.000 | 0.50 | PASS |

| Flicker measurement 2 | EUT values | Limit | Result |
|---|---|---|---|
| Pst | 0.062 | 1.00 | PASS |
| dc [%] | 0.000 | 3.30 | PASS |
| dmax [%] | 0.078 | 4.00 | PASS |
| dt [s] | 0.000 | 0.50 | PASS |

| Flicker measurement 3 | EUT values | Limit | Result |
|---|---|---|---|
| Pst | 0.062 | 1.00 | PASS |
| dc [%] | 0.000 | 3.30 | PASS |
| dmax [%] | 0.088 | 4.00 | PASS |
| dt [s] | 0.000 | 0.50 | PASS |

| Flicker measurement 4 | EUT values | Limit | Result |
|---|---|---|---|
| Pst | 0.234 | 1.00 | PASS |
| dc [%] | 0.033 | 3.30 | PASS |
| dmax [%] | 0.195 | 4.00 | PASS |
| dt [s] | 0.000 | 0.50 | PASS |

| Flicker measurement 5 | **EUT values** | **Limit** | **Result** |
|---|---|---|---|
| Pst | 0.139 | 1.00 | PASS |
| dc [%] | 0.017 | 3.30 | PASS |
| dmax [%] | 0.185 | 4.00 | PASS |
| dt [s] | 0.000 | 0.50 | PASS |

| Flicker measurement 6 | **EUT values** | **Limit** | **Result** |
|---|---|---|---|
| Pst | 0.047 | 1.00 | PASS |
| dc [%] | 0.000 | 3.30 | PASS |
| dmax [%] | 0.081 | 4.00 | PASS |
| dt [s] | 0.000 | 0.50 | PASS |

| Flicker measurement 7 | **EUT values** | **Limit** | **Result** |
|---|---|---|---|
| Pst | 0.052 | 1.00 | PASS |
| dc [%] | 0.000 | 3.30 | PASS |
| dmax [%] | 0.082 | 4.00 | PASS |
| dt [s] | 0.000 | 0.50 | PASS |

| Flicker measurement 8 | **EUT values** | **Limit** | **Result** |
|---|---|---|---|
| Pst | 0.052 | 1.00 | PASS |
| dc [%] | 0.000 | 3.30 | PASS |
| dmax [%] | 0.079 | 4.00 | PASS |
| dt [s] | 0.000 | 0.50 | PASS |

| Flicker measurement 9 | **EUT values** | **Limit** | **Result** |
|---|---|---|---|
| Pst | 0.052 | 1.00 | PASS |
| dc [%] | 0.000 | 3.30 | PASS |
| dmax [%] | 0.082 | 4.00 | PASS |
| dt [s] | 0.000 | 0.50 | PASS |

| Flicker measurement 10 | **EUT values** | **Limit** | **Result** |
|---|---|---|---|
| Pst | 0.057 | 1.00 | PASS |
| dc [%] | 0.000 | 3.30 | PASS |
| dmax [%] | 0.079 | 4.00 | PASS |
| dt [s] | 0.000 | 0.50 | PASS |

| Flicker measurement 11 | **EUT values** | **Limit** | **Result** |
|---|---|---|---|
| Pst | 0.057 | 1.00 | PASS |
| dc [%] | 0.000 | 3.30 | PASS |
| dmax [%] | 0.080 | 4.00 | PASS |
| dt [s] | 0.000 | 0.50 | PASS |

| Flicker measurement 12 | **EUT values** | **Limit** | **Result** |
|---|---|---|---|
| Pst | 0.052 | 1.00 | PASS |
| dc [%] | 0.000 | 3.30 | PASS |
| dmax [%] | 0.078 | 4.00 | PASS |
| dt [s] | 0.000 | 0.50 | PASS |

# *Test Report*

| | |
|---|---|
| Report title: | Harmonics and Flicker |
| Company Name: | Segway |
| Date of test: | 5:34 28.Jun 2005 |
| Measurement file name: | Harmonics_3_2_Ed3 QS.rsd |
| Tester: | GC |
| Standard used: | EN/IEC 61000-3-2 Ed.3 Quasi-stationary<br>Equipment class A <= 150% of the limit |
| Observation time: | 60s |
| Windows width: | 10 periods - (EN/IEC 61000-4-7 Edition 2002 + A1:2008) |
| Customer: | |
| E. U. T.: | PT SE |
| | 230VAC, 50Hz |

| **Test Result** | |
|---|---|
| E. U. T.: | PASS |
| Power Source: | PASS |

| | | | |
|---|---|---|---|
| (Date) | | (Sign) | |

# E. U. T. Result

## *Check harmonics 2..40 [exception odd 21..39]:*

| | |
|---|---|
| **Harmonic(s) > 150%:** | |
| Order (n): | None |
| **Harmonic(s) with average > 100%:** | |
| Order (n): | None |

## *Check odd harmonics 21..39:*

| | |
|---|---|
| **All Partial Odd Harmonics below partial limits.** | |
| **Harmonic(s) > 150%:** | |
| Order (n): | None |
| **Harmonic(s) with average > 150%:** | |
| Order (n): | None |

## Power Source Result

| | | | | |
|---|---|---|---|---|
| **First dataset out of limit:** | | | | |
| DS (time): | None | | | |
| **Harmonic(s) out of limit:** | | | | |
| Order (n): | None | | | |

| ***Average Harmonic Current Results*** | | | | |
|---|---|---|---|---|
| Hn | Ieff [A] | % of Limit | Limit [A] | Result |
| 1 | 495.848E-3 | | | |
| 2 | 8.144E-3 | 0.754 | 1.08 | PASS |
| 3 | 67.987E-3 | 2.956 | 2.30 | PASS |
| 4 | 7.314E-3 | 1.701 | 430.00E-3 | PASS |
| 5 | 39.480E-3 | 3.463 | 1.14 | PASS |
| 6 | 6.549E-3 | 2.183 | 300.00E-3 | PASS |
| 7 | 9.581E-3 | 1.244 | 770.00E-3 | PASS |
| 8 | 6.319E-3 | 2.747 | 230.00E-3 | PASS |
| 9 | 6.554E-3 | 1.639 | 400.00E-3 | PASS |
| 10 | 5.099E-3 | 2.771 | 184.00E-3 | PASS |
| 11 | 21.916E-3 | 6.641 | 330.00E-3 | PASS |
| 12 | 5.022E-3 | 3.275 | 153.33E-3 | PASS |
| 13 | 9.220E-3 | 4.390 | 210.00E-3 | PASS |
| 14 | 4.813E-3 | 3.662 | 131.43E-3 | PASS |
| 15 | 15.615E-3 | 10.410 | 150.00E-3 | PASS |
| 16 | 5.038E-3 | 4.381 | 115.00E-3 | PASS |
| 17 | 7.123E-3 | 5.382 | 132.35E-3 | PASS |
| 18 | 5.155E-3 | 5.043 | 102.22E-3 | PASS |
| 19 | 7.842E-3 | 6.622 | 118.42E-3 | PASS |
| 20 | 5.230E-3 | 5.685 | 92.00E-3 | PASS |
| 21 | 6.776E-3 | 4.217 | 160.71E-3 | PASS |
| 22 | 5.122E-3 | 6.124 | 83.64E-3 | PASS |
| 23 | 6.702E-3 | 4.567 | 146.74E-3 | PASS |
| 24 | 4.930E-3 | 6.431 | 76.66E-3 | PASS |
| 25 | 6.813E-3 | 5.046 | 135.00E-3 | PASS |
| 26 | 4.616E-3 | 6.523 | 70.77E-3 | PASS |
| 27 | 8.741E-3 | 6.993 | 124.99E-3 | PASS |
| 28 | 4.852E-3 | 7.385 | 65.71E-3 | PASS |
| 29 | 5.300E-3 | 4.554 | 116.39E-3 | PASS |
| 30 | 4.934E-3 | 8.045 | 61.33E-3 | PASS |
| 31 | 5.184E-3 | 4.761 | 108.87E-3 | PASS |
| 32 | 4.264E-3 | 7.415 | 57.50E-3 | PASS |
| 33 | 4.473E-3 | 4.374 | 102.27E-3 | PASS |
| 34 | 3.688E-3 | 6.814 | 54.12E-3 | PASS |
| 35 | 4.332E-3 | 4.492 | 96.44E-3 | PASS |
| 36 | 3.405E-3 | 6.661 | 51.11E-3 | PASS |
| 37 | 3.568E-3 | 3.912 | 91.21E-3 | PASS |
| 38 | 3.134E-3 | 6.472 | 48.42E-3 | PASS |
| 39 | 3.550E-3 | 4.102 | 86.53E-3 | PASS |
| 40 | 3.084E-3 | 6.705 | 46.00E-3 | PASS |

| ***Maximum Harmonic Current Results*** | | | | |
|---|---|---|---|---|
| Hn | Ieff [A] | % of Limit | Limit [A] | Result |
| 1 | 496.279E-3 | | | |
| 2 | 9.159E-3 | 0.565 | 1.62 | PASS |
| 3 | 68.955E-3 | 1.999 | 3.45 | PASS |
| 4 | 7.931E-3 | 1.230 | 645.00E-3 | PASS |
| 5 | 40.456E-3 | 2.366 | 1.71 | PASS |
| 6 | 7.081E-3 | 1.574 | 450.00E-3 | PASS |
| 7 | 10.377E-3 | 0.898 | 1.15 | PASS |
| 8 | 7.002E-3 | 2.030 | 345.00E-3 | PASS |
| 9 | 7.057E-3 | 1.176 | 600.00E-3 | PASS |
| 10 | 5.627E-3 | 2.039 | 276.00E-3 | PASS |
| 11 | 22.622E-3 | 4.570 | 495.00E-3 | PASS |
| 12 | 5.660E-3 | 2.461 | 229.99E-3 | PASS |
| 13 | 9.779E-3 | 3.104 | 315.00E-3 | PASS |
| 14 | 5.268E-3 | 2.672 | 197.15E-3 | PASS |
| 15 | 16.413E-3 | 7.295 | 225.00E-3 | PASS |
| 16 | 5.459E-3 | 3.164 | 172.50E-3 | PASS |
| 17 | 7.883E-3 | 3.971 | 198.52E-3 | PASS |
| 18 | 5.587E-3 | 3.644 | 153.33E-3 | PASS |
| 19 | 8.281E-3 | 4.662 | 177.63E-3 | PASS |
| 20 | 5.780E-3 | 4.189 | 138.00E-3 | PASS |
| 21 | 7.532E-3 | 4.687 | 160.71E-3 | PASS |
| 22 | 5.513E-3 | 4.394 | 125.46E-3 | PASS |
| 23 | 7.516E-3 | 5.122 | 146.74E-3 | PASS |
| 24 | 5.301E-3 | 4.610 | 114.99E-3 | PASS |
| 25 | 7.201E-3 | 5.334 | 135.00E-3 | PASS |
| 26 | 5.145E-3 | 4.847 | 106.16E-3 | PASS |
| 27 | 9.385E-3 | 7.508 | 124.99E-3 | PASS |
| 28 | 5.369E-3 | 5.447 | 98.57E-3 | PASS |
| 29 | 5.802E-3 | 4.986 | 116.39E-3 | PASS |
| 30 | 5.402E-3 | 5.872 | 92.00E-3 | PASS |
| 31 | 5.694E-3 | 5.230 | 108.87E-3 | PASS |
| 32 | 4.662E-3 | 5.405 | 86.25E-3 | PASS |
| 33 | 4.804E-3 | 4.697 | 102.27E-3 | PASS |
| 34 | 4.043E-3 | 4.980 | 81.18E-3 | PASS |
| 35 | 4.668E-3 | 4.840 | 96.44E-3 | PASS |
| 36 | 3.763E-3 | 4.909 | 76.66E-3 | PASS |
| 37 | 3.827E-3 | 4.196 | 91.21E-3 | PASS |
| 38 | 3.508E-3 | 4.830 | 72.63E-3 | PASS |
| 39 | 3.883E-3 | 4.488 | 86.53E-3 | PASS |
| 40 | 3.399E-3 | 4.926 | 69.00E-3 | PASS |

| ***Maximum Harmonic Voltage Results*** | | | | |
|---|---|---|---|---|
| Hn | Ueff [V] | Ueff [%] | Limit [%] | Result |
| 1 | 230.30 | 100.128 | | |
| 2 | 13.10E-3 | 0.006 | 0.2 | PASS |
| 3 | 76.06E-3 | 0.033 | 0.9 | PASS |
| 4 | 17.09E-3 | 0.007 | 0.2 | PASS |
| 5 | 25.74E-3 | 0.011 | 0.4 | PASS |
| 6 | 15.49E-3 | 0.007 | 0.2 | PASS |
| 7 | 9.10E-3 | 0.004 | 0.3 | PASS |
| 8 | 9.63E-3 | 0.004 | 0.2 | PASS |
| 9 | 10.19E-3 | 0.004 | 0.2 | PASS |
| 10 | 7.44E-3 | 0.003 | 0.2 | PASS |
| 11 | 6.40E-3 | 0.003 | 0.1 | PASS |
| 12 | 6.28E-3 | 0.003 | 0.1 | PASS |
| 13 | 5.10E-3 | 0.002 | 0.1 | PASS |
| 14 | 5.37E-3 | 0.002 | 0.1 | PASS |
| 15 | 10.52E-3 | 0.005 | 0.1 | PASS |
| 16 | 6.96E-3 | 0.003 | 0.1 | PASS |
| 17 | 5.17E-3 | 0.002 | 0.1 | PASS |
| 18 | 7.08E-3 | 0.003 | 0.1 | PASS |
| 19 | 6.89E-3 | 0.003 | 0.1 | PASS |
| 20 | 5.91E-3 | 0.003 | 0.1 | PASS |
| 21 | 3.92E-3 | 0.002 | 0.1 | PASS |
| 22 | 5.15E-3 | 0.002 | 0.1 | PASS |
| 23 | 8.30E-3 | 0.004 | 0.1 | PASS |
| 24 | 6.14E-3 | 0.003 | 0.1 | PASS |
| 25 | 8.75E-3 | 0.004 | 0.1 | PASS |
| 26 | 6.08E-3 | 0.003 | 0.1 | PASS |
| 27 | 11.99E-3 | 0.005 | 0.1 | PASS |
| 28 | 4.56E-3 | 0.002 | 0.1 | PASS |
| 29 | 5.07E-3 | 0.002 | 0.1 | PASS |
| 30 | 4.16E-3 | 0.002 | 0.1 | PASS |
| 31 | 6.92E-3 | 0.003 | 0.1 | PASS |
| 32 | 5.78E-3 | 0.003 | 0.1 | PASS |
| 33 | 12.81E-3 | 0.006 | 0.1 | PASS |
| 34 | 5.12E-3 | 0.002 | 0.1 | PASS |
| 35 | 5.78E-3 | 0.003 | 0.1 | PASS |
| 36 | 3.74E-3 | 0.002 | 0.1 | PASS |
| 37 | 8.42E-3 | 0.004 | 0.1 | PASS |
| 38 | 4.85E-3 | 0.002 | 0.1 | PASS |
| 39 | 5.62E-3 | 0.002 | 0.1 | PASS |
| 40 | 5.35E-3 | 0.002 | 0.1 | PASS |

# *Test Report*

| | |
|---|---|
| Report title: | Harmonics and Flicker |
| Company Name: | Segway |
| Date of test: | 5:34 28.Jun 2005 |
| Measurement file name: | Harmonics_3_2_Ed3 QS.rsd |
| Tester: | GC |
| Standard used: | EN/IEC 61000-3-2 Ed.3 Quasi-stationary<br>Equipment class A <= 150% of the limit |
| Observation time: | 60s |
| Windows width: | 10 periods - (EN/IEC 61000-4-7 Edition 2002 + A1:2008) |
| Customer: | |
| E. U. T.: | PT SE |
| | 230VAC, 50Hz |

| **Test Result** | |
|---|---|
| E. U. T.: | PASS |
| Power Source: | PASS |

| | | | |
|---|---|---|---|
| (Date) | | (Sign) | |

# E. U. T. Result

## *Check Harmonics 2..40 [exception odd 21..39]:*

| | |
|---|---|
| **Harmonic(s) > 150%:** | |
| Order (n): | None |
| **Harmonic(s) with average > 100%:** | |
| Order (n): | None |

## *Check odd Harmonics 21..39:*

| | |
|---|---|
| **All Partial Odd Harmonics below partial limits.** | |
| **Harmonic(s) > 150%:** | |
| Order (n): | None |
| **Harmonic(s) with average > 150%:** | |
| Order (n): | None |

## Power Source Result

| | | | | |
|---|---|---|---|---|
| **First dataset out of limit:** | | | | |
| DS (time): | None | | | |
| **Harmonic(s) out of limit:** | | | | |
| Order (n): | None | | | |

| ***Average Harmonic Current Results*** | | | | |
|---|---|---|---|---|
| Hn | Ieff [A] | % of Limit | Limit [A] | Result |
| 1 | 495.848E-3 | | | |
| 2 | 8.144E-3 | 0.754 | 1.08 | PASS |
| 3 | 67.987E-3 | 2.956 | 2.30 | PASS |
| 4 | 7.314E-3 | 1.701 | 430.00E-3 | PASS |
| 5 | 39.480E-3 | 3.463 | 1.14 | PASS |
| 6 | 6.549E-3 | 2.183 | 300.00E-3 | PASS |
| 7 | 9.581E-3 | 1.244 | 770.00E-3 | PASS |
| 8 | 6.319E-3 | 2.747 | 230.00E-3 | PASS |
| 9 | 6.554E-3 | 1.639 | 400.00E-3 | PASS |
| 10 | 5.099E-3 | 2.771 | 184.00E-3 | PASS |
| 11 | 21.916E-3 | 6.641 | 330.00E-3 | PASS |
| 12 | 5.022E-3 | 3.275 | 153.33E-3 | PASS |
| 13 | 9.220E-3 | 4.390 | 210.00E-3 | PASS |
| 14 | 4.813E-3 | 3.662 | 131.43E-3 | PASS |
| 15 | 15.615E-3 | 10.410 | 150.00E-3 | PASS |
| 16 | 5.038E-3 | 4.381 | 115.00E-3 | PASS |
| 17 | 7.123E-3 | 5.382 | 132.35E-3 | PASS |
| 18 | 5.155E-3 | 5.043 | 102.22E-3 | PASS |
| 19 | 7.842E-3 | 6.622 | 118.42E-3 | PASS |
| 20 | 5.230E-3 | 5.685 | 92.00E-3 | PASS |
| 21 | 6.776E-3 | 4.217 | 160.71E-3 | PASS |
| 22 | 5.122E-3 | 6.124 | 83.64E-3 | PASS |
| 23 | 6.702E-3 | 4.567 | 146.74E-3 | PASS |
| 24 | 4.930E-3 | 6.431 | 76.66E-3 | PASS |
| 25 | 6.813E-3 | 5.046 | 135.00E-3 | PASS |
| 26 | 4.616E-3 | 6.523 | 70.77E-3 | PASS |
| 27 | 8.741E-3 | 6.993 | 124.99E-3 | PASS |
| 28 | 4.852E-3 | 7.385 | 65.71E-3 | PASS |
| 29 | 5.300E-3 | 4.554 | 116.39E-3 | PASS |
| 30 | 4.934E-3 | 8.045 | 61.33E-3 | PASS |
| 31 | 5.184E-3 | 4.761 | 108.87E-3 | PASS |
| 32 | 4.264E-3 | 7.415 | 57.50E-3 | PASS |
| 33 | 4.473E-3 | 4.374 | 102.27E-3 | PASS |
| 34 | 3.688E-3 | 6.814 | 54.12E-3 | PASS |
| 35 | 4.332E-3 | 4.492 | 96.44E-3 | PASS |
| 36 | 3.405E-3 | 6.661 | 51.11E-3 | PASS |
| 37 | 3.568E-3 | 3.912 | 91.21E-3 | PASS |
| 38 | 3.134E-3 | 6.472 | 48.42E-3 | PASS |
| 39 | 3.550E-3 | 4.102 | 86.53E-3 | PASS |
| 40 | 3.084E-3 | 6.705 | 46.00E-3 | PASS |

| ***Maximum Harmonic Current Results*** | | | | |
|---|---|---|---|---|
| Hn | Ieff [A] | % of Limit | Limit [A] | Result |
| 1 | 496.279E-3 | | | |
| 2 | 9.159E-3 | 0.565 | 1.62 | PASS |
| 3 | 68.955E-3 | 1.999 | 3.45 | PASS |
| 4 | 7.931E-3 | 1.230 | 645.00E-3 | PASS |
| 5 | 40.456E-3 | 2.366 | 1.71 | PASS |
| 6 | 7.081E-3 | 1.574 | 450.00E-3 | PASS |
| 7 | 10.377E-3 | 0.898 | 1.15 | PASS |
| 8 | 7.002E-3 | 2.030 | 345.00E-3 | PASS |
| 9 | 7.057E-3 | 1.176 | 600.00E-3 | PASS |
| 10 | 5.627E-3 | 2.039 | 276.00E-3 | PASS |
| 11 | 22.622E-3 | 4.570 | 495.00E-3 | PASS |
| 12 | 5.660E-3 | 2.461 | 229.99E-3 | PASS |
| 13 | 9.779E-3 | 3.104 | 315.00E-3 | PASS |
| 14 | 5.268E-3 | 2.672 | 197.15E-3 | PASS |
| 15 | 16.413E-3 | 7.295 | 225.00E-3 | PASS |
| 16 | 5.459E-3 | 3.164 | 172.50E-3 | PASS |
| 17 | 7.883E-3 | 3.971 | 198.52E-3 | PASS |
| 18 | 5.587E-3 | 3.644 | 153.33E-3 | PASS |
| 19 | 8.281E-3 | 4.662 | 177.63E-3 | PASS |
| 20 | 5.780E-3 | 4.189 | 138.00E-3 | PASS |
| 21 | 7.532E-3 | 4.687 | 160.71E-3 | PASS |
| 22 | 5.513E-3 | 4.394 | 125.46E-3 | PASS |
| 23 | 7.516E-3 | 5.122 | 146.74E-3 | PASS |
| 24 | 5.301E-3 | 4.610 | 114.99E-3 | PASS |
| 25 | 7.201E-3 | 5.334 | 135.00E-3 | PASS |
| 26 | 5.145E-3 | 4.847 | 106.16E-3 | PASS |
| 27 | 9.385E-3 | 7.508 | 124.99E-3 | PASS |
| 28 | 5.369E-3 | 5.447 | 98.57E-3 | PASS |
| 29 | 5.802E-3 | 4.986 | 116.39E-3 | PASS |
| 30 | 5.402E-3 | 5.872 | 92.00E-3 | PASS |
| 31 | 5.694E-3 | 5.230 | 108.87E-3 | PASS |
| 32 | 4.662E-3 | 5.405 | 86.25E-3 | PASS |
| 33 | 4.804E-3 | 4.697 | 102.27E-3 | PASS |
| 34 | 4.043E-3 | 4.980 | 81.18E-3 | PASS |
| 35 | 4.668E-3 | 4.840 | 96.44E-3 | PASS |
| 36 | 3.763E-3 | 4.909 | 76.66E-3 | PASS |
| 37 | 3.827E-3 | 4.196 | 91.21E-3 | PASS |
| 38 | 3.508E-3 | 4.830 | 72.63E-3 | PASS |
| 39 | 3.883E-3 | 4.488 | 86.53E-3 | PASS |
| 40 | 3.399E-3 | 4.926 | 69.00E-3 | PASS |

| ***Maximum Harmonic Voltage Results*** | | | | |
|---|---|---|---|---|
| Hn | Ueff [V] | Ueff [%] | Limit [%] | Result |
| 1 | 230.30 | 100.128 | | |
| 2 | 13.10E-3 | 0.006 | 0.2 | PASS |
| 3 | 76.06E-3 | 0.033 | 0.9 | PASS |
| 4 | 17.09E-3 | 0.007 | 0.2 | PASS |
| 5 | 25.74E-3 | 0.011 | 0.4 | PASS |
| 6 | 15.49E-3 | 0.007 | 0.2 | PASS |
| 7 | 9.10E-3 | 0.004 | 0.3 | PASS |
| 8 | 9.63E-3 | 0.004 | 0.2 | PASS |
| 9 | 10.19E-3 | 0.004 | 0.2 | PASS |
| 10 | 7.44E-3 | 0.003 | 0.2 | PASS |
| 11 | 6.40E-3 | 0.003 | 0.1 | PASS |
| 12 | 6.28E-3 | 0.003 | 0.1 | PASS |
| 13 | 5.10E-3 | 0.002 | 0.1 | PASS |
| 14 | 5.37E-3 | 0.002 | 0.1 | PASS |
| 15 | 10.52E-3 | 0.005 | 0.1 | PASS |
| 16 | 6.96E-3 | 0.003 | 0.1 | PASS |
| 17 | 5.17E-3 | 0.002 | 0.1 | PASS |
| 18 | 7.08E-3 | 0.003 | 0.1 | PASS |
| 19 | 6.89E-3 | 0.003 | 0.1 | PASS |
| 20 | 5.91E-3 | 0.003 | 0.1 | PASS |
| 21 | 3.92E-3 | 0.002 | 0.1 | PASS |
| 22 | 5.15E-3 | 0.002 | 0.1 | PASS |
| 23 | 8.30E-3 | 0.004 | 0.1 | PASS |
| 24 | 6.14E-3 | 0.003 | 0.1 | PASS |
| 25 | 8.75E-3 | 0.004 | 0.1 | PASS |
| 26 | 6.08E-3 | 0.003 | 0.1 | PASS |
| 27 | 11.99E-3 | 0.005 | 0.1 | PASS |
| 28 | 4.56E-3 | 0.002 | 0.1 | PASS |
| 29 | 5.07E-3 | 0.002 | 0.1 | PASS |
| 30 | 4.16E-3 | 0.002 | 0.1 | PASS |
| 31 | 6.92E-3 | 0.003 | 0.1 | PASS |
| 32 | 5.78E-3 | 0.003 | 0.1 | PASS |
| 33 | 12.81E-3 | 0.006 | 0.1 | PASS |
| 34 | 5.12E-3 | 0.002 | 0.1 | PASS |
| 35 | 5.78E-3 | 0.003 | 0.1 | PASS |
| 36 | 3.74E-3 | 0.002 | 0.1 | PASS |
| 37 | 8.42E-3 | 0.004 | 0.1 | PASS |
| 38 | 4.85E-3 | 0.002 | 0.1 | PASS |
| 39 | 5.62E-3 | 0.002 | 0.1 | PASS |
| 40 | 5.35E-3 | 0.002 | 0.1 | PASS |

# *Test Report*

| | |
|---|---|
| Report title: | Harmonics and Flicker |
| Company Name: | Segway |
| Date of test: | 8:01 28.Jun 2005 |
| Measurement file name: | Harmonics_3_2_Ed3 RANDOM.rsd |
| Tester: | GC |
| Standard used: | EN/IEC 61000-3-2 Ed.3 Random<br>Equipment class A <= 150% of the limit |
| Observation time: | 60s |
| Windows width: | 10 periods - (EN/IEC 61000-4-7 Edition 2002 + A1:2008) |
| Customer: | |
| E. U. T.: | PT SE |
| | 230VAC, 50Hz |

| **Test Result** | |
|---|---|
| E. U. T.: | PASS |
| Power Source: | PASS |

| | | | |
|---|---|---|---|
| (Date) | | (Sign) | |

# E. U. T. Result

## *Check Harmonics 2..40 [exception odd 21..39]:*

| | |
|---|---|
| **Harmonic(s) > 150%:** | |
| Order (n): | None |
| **Harmonic(s) with average > 100%:** | |
| Order (n): | None |

## *Check odd Harmonics 21..39:*

| | |
|---|---|
| **All Partial Odd Harmonics below partial limits.** | |
| **Harmonic(s) > 150%:** | |
| Order (n): | None |
| **Harmonic(s) with average > 150%:** | |
| Order (n): | None |

## Power Source Result

| | | | | |
|---|---|---|---|---|
| **First dataset out of limit:** | | | | |
| DS (time): | None | | | |
| **Harmonic(s) out of limit:** | | | | |
| Order (n): | None | | | |

| ***Average Harmonic Current Results*** | | | | |
|---|---|---|---|---|
| Hn | Ieff [A] | % of Limit | Limit [A] | Result |
| 1 | 274.468E-3 | | | |
| 2 | 1.104E-3 | 0.102 | 1.08 | PASS |
| 3 | 35.706E-3 | 1.552 | 2.30 | PASS |
| 4 | 932.415E-6 | 0.217 | 430.00E-3 | PASS |
| 5 | 12.202E-3 | 1.070 | 1.14 | PASS |
| 6 | 1.012E-3 | 0.337 | 300.00E-3 | PASS |
| 7 | 18.079E-3 | 2.348 | 770.00E-3 | PASS |
| 8 | 810.857E-6 | 0.353 | 230.00E-3 | PASS |
| 9 | 5.245E-3 | 1.311 | 400.00E-3 | PASS |
| 10 | 849.712E-6 | 0.462 | 184.00E-3 | PASS |
| 11 | 10.477E-3 | 3.175 | 330.00E-3 | PASS |
| 12 | 778.726E-6 | 0.508 | 153.33E-3 | PASS |
| 13 | 8.437E-3 | 4.018 | 210.00E-3 | PASS |
| 14 | 748.001E-6 | 0.569 | 131.43E-3 | PASS |
| 15 | 1.301E-3 | 0.868 | 150.00E-3 | PASS |
| 16 | 758.769E-6 | 0.660 | 115.00E-3 | PASS |
| 17 | 4.829E-3 | 3.649 | 132.35E-3 | PASS |
| 18 | 763.116E-6 | 0.747 | 102.22E-3 | PASS |
| 19 | 1.695E-3 | 1.431 | 118.42E-3 | PASS |
| 20 | 721.965E-6 | 0.785 | 92.00E-3 | PASS |
| 21 | 2.155E-3 | 1.341 | 160.71E-3 | PASS |
| 22 | 806.744E-6 | 0.965 | 83.64E-3 | PASS |
| 23 | 3.268E-3 | 2.227 | 146.74E-3 | PASS |
| 24 | 749.251E-6 | 0.977 | 76.66E-3 | PASS |
| 25 | 1.125E-3 | 0.833 | 135.00E-3 | PASS |
| 26 | 859.496E-6 | 1.214 | 70.77E-3 | PASS |
| 27 | 1.832E-3 | 1.466 | 124.99E-3 | PASS |
| 28 | 778.444E-6 | 1.185 | 65.71E-3 | PASS |
| 29 | 2.193E-3 | 1.885 | 116.39E-3 | PASS |
| 30 | 757.232E-6 | 1.235 | 61.33E-3 | PASS |
| 31 | 840.242E-6 | 0.772 | 108.87E-3 | PASS |
| 32 | 744.060E-6 | 1.294 | 57.50E-3 | PASS |
| 33 | 2.232E-3 | 2.182 | 102.27E-3 | PASS |
| 34 | 721.492E-6 | 1.333 | 54.12E-3 | PASS |
| 35 | 2.304E-3 | 2.389 | 96.44E-3 | PASS |
| 36 | 732.073E-6 | 1.432 | 51.11E-3 | PASS |
| 37 | 1.040E-3 | 1.140 | 91.21E-3 | PASS |
| 38 | 809.948E-6 | 1.673 | 48.42E-3 | PASS |
| 39 | 1.498E-3 | 1.731 | 86.53E-3 | PASS |
| 40 | 730.049E-6 | 1.587 | 46.00E-3 | PASS |

| ***Maximum Harmonic Current Results*** | | | | |
|---|---|---|---|---|
| Hn | Ieff [A] | % of Limit | Limit [A] | Result |
| 1 | 274.633E-3 | | | |
| 2 | 1.314E-3 | 0.081 | 1.62 | PASS |
| 3 | 35.842E-3 | 1.039 | 3.45 | PASS |
| 4 | 1.012E-3 | 0.157 | 645.00E-3 | PASS |
| 5 | 12.465E-3 | 0.729 | 1.71 | PASS |
| 6 | 1.191E-3 | 0.265 | 450.00E-3 | PASS |
| 7 | 18.198E-3 | 1.576 | 1.15 | PASS |
| 8 | 881.718E-6 | 0.256 | 345.00E-3 | PASS |
| 9 | 5.332E-3 | 0.889 | 600.00E-3 | PASS |
| 10 | 935.267E-6 | 0.339 | 276.00E-3 | PASS |
| 11 | 10.613E-3 | 2.144 | 495.00E-3 | PASS |
| 12 | 856.850E-6 | 0.373 | 229.99E-3 | PASS |
| 13 | 8.883E-3 | 2.820 | 315.00E-3 | PASS |
| 14 | 815.978E-6 | 0.414 | 197.15E-3 | PASS |
| 15 | 1.430E-3 | 0.635 | 225.00E-3 | PASS |
| 16 | 859.009E-6 | 0.498 | 172.50E-3 | PASS |
| 17 | 5.468E-3 | 2.754 | 198.52E-3 | PASS |
| 18 | 843.780E-6 | 0.550 | 153.33E-3 | PASS |
| 19 | 2.010E-3 | 1.131 | 177.63E-3 | PASS |
| 20 | 804.638E-6 | 0.583 | 138.00E-3 | PASS |
| 21 | 2.223E-3 | 1.383 | 160.71E-3 | PASS |
| 22 | 901.865E-6 | 0.719 | 125.46E-3 | PASS |
| 23 | 3.526E-3 | 2.403 | 146.74E-3 | PASS |
| 24 | 835.472E-6 | 0.727 | 114.99E-3 | PASS |
| 25 | 1.502E-3 | 1.112 | 135.00E-3 | PASS |
| 26 | 1.115E-3 | 1.051 | 106.16E-3 | PASS |
| 27 | 1.906E-3 | 1.525 | 124.99E-3 | PASS |
| 28 | 857.878E-6 | 0.870 | 98.57E-3 | PASS |
| 29 | 2.322E-3 | 1.995 | 116.39E-3 | PASS |
| 30 | 920.583E-6 | 1.001 | 92.00E-3 | PASS |
| 31 | 1.054E-3 | 0.968 | 108.87E-3 | PASS |
| 32 | 818.026E-6 | 0.948 | 86.25E-3 | PASS |
| 33 | 2.334E-3 | 2.282 | 102.27E-3 | PASS |
| 34 | 789.135E-6 | 0.972 | 81.18E-3 | PASS |
| 35 | 2.428E-3 | 2.518 | 96.44E-3 | PASS |
| 36 | 801.366E-6 | 1.045 | 76.66E-3 | PASS |
| 37 | 1.128E-3 | 1.236 | 91.21E-3 | PASS |
| 38 | 901.182E-6 | 1.241 | 72.63E-3 | PASS |
| 39 | 1.834E-3 | 2.120 | 86.53E-3 | PASS |
| 40 | 799.805E-6 | 1.159 | 69.00E-3 | PASS |

| ***Maximum Harmonic Voltage Results*** | | | | |
|---|---|---|---|---|
| Hn | Ueff [V] | Ueff [%] | Limit [%] | Result |
| 1 | 230.29 | 100.127 | | |
| 2 | 11.52E-3 | 0.005 | 0.2 | PASS |
| 3 | 72.45E-3 | 0.032 | 0.9 | PASS |
| 4 | 15.82E-3 | 0.007 | 0.2 | PASS |
| 5 | 24.54E-3 | 0.011 | 0.4 | PASS |
| 6 | 16.38E-3 | 0.007 | 0.2 | PASS |
| 7 | 8.41E-3 | 0.004 | 0.3 | PASS |
| 8 | 10.72E-3 | 0.005 | 0.2 | PASS |
| 9 | 10.14E-3 | 0.004 | 0.2 | PASS |
| 10 | 7.99E-3 | 0.003 | 0.2 | PASS |
| 11 | 6.54E-3 | 0.003 | 0.1 | PASS |
| 12 | 5.56E-3 | 0.002 | 0.1 | PASS |
| 13 | 5.13E-3 | 0.002 | 0.1 | PASS |
| 14 | 7.02E-3 | 0.003 | 0.1 | PASS |
| 15 | 11.86E-3 | 0.005 | 0.1 | PASS |
| 16 | 5.83E-3 | 0.003 | 0.1 | PASS |
| 17 | 5.88E-3 | 0.003 | 0.1 | PASS |
| 18 | 5.89E-3 | 0.003 | 0.1 | PASS |
| 19 | 5.90E-3 | 0.003 | 0.1 | PASS |
| 20 | 5.12E-3 | 0.002 | 0.1 | PASS |
| 21 | 6.01E-3 | 0.003 | 0.1 | PASS |
| 22 | 6.14E-3 | 0.003 | 0.1 | PASS |
| 23 | 8.72E-3 | 0.004 | 0.1 | PASS |
| 24 | 5.90E-3 | 0.003 | 0.1 | PASS |
| 25 | 8.65E-3 | 0.004 | 0.1 | PASS |
| 26 | 4.80E-3 | 0.002 | 0.1 | PASS |
| 27 | 12.46E-3 | 0.005 | 0.1 | PASS |
| 28 | 4.16E-3 | 0.002 | 0.1 | PASS |
| 29 | 4.66E-3 | 0.002 | 0.1 | PASS |
| 30 | 4.74E-3 | 0.002 | 0.1 | PASS |
| 31 | 7.24E-3 | 0.003 | 0.1 | PASS |
| 32 | 5.45E-3 | 0.002 | 0.1 | PASS |
| 33 | 12.77E-3 | 0.006 | 0.1 | PASS |
| 34 | 4.84E-3 | 0.002 | 0.1 | PASS |
| 35 | 5.41E-3 | 0.002 | 0.1 | PASS |
| 36 | 4.37E-3 | 0.002 | 0.1 | PASS |
| 37 | 9.13E-3 | 0.004 | 0.1 | PASS |
| 38 | 4.63E-3 | 0.002 | 0.1 | PASS |
| 39 | 5.52E-3 | 0.002 | 0.1 | PASS |
| 40 | 4.51E-3 | 0.002 | 0.1 | PASS |

# END OF TEST REPORT