EXPLANATORY NOTE – LABORATORY TESTS FOR STANDBY POWER CONTROLLERS

Version 1.3 – 7 June 2017

The Victorian Energy Efficiency Target (VEET) scheme is a Victorian Government initiative promoted as *the Energy Saver Incentive.*

This document sets forth the laboratory test requirements for standby power controllers (SPCs).

Please note that the Essential Services Commission (ESC) will only accept laboratory test results from tests undertaken on an SPC with the same exact model number as that of the SPC on the VEET Scheme application form. ESC will not accept test results from pre-production / prototype models. Further, the ESC will not assess any product that does not have electrical authority approval from Energy Safe Victoria (or an equivalent electrical safety authority).

The full application procedure is set out in Sections 2 of this explanatory note.

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1 INTRODUCTION

1.1 SCOPE

A standby power controller (SPC) is defined by the *Victorian Energy Efficiency Target Regulations 2008* (the Regulations) as a product that is intended to automatically reduce the standby energy consumption of equipment connected to it.

This explanatory note specifies test methods and compliance conditions for SPCs as defined by the Regulations, which defines a SPC as a product that is intended to automatically reduce the standby energy consumption of equipment connected to it.

Before undertaking any laboratory test, the proponent should be familiar with the Regulations and the associated documents, and the 'VEET Scheme Application Process for SPCs' as outlined in Section 2 of this document.

Please note that the Essential Services Commission (ESC) will only accept laboratory test results from tests undertaken on a SPC with the same exact model number as that of the SPC applied for. ESC will not accept test results from pre-production / prototype models. Further, the ESC will not assess any product that does not have electrical authority approval from Energy Safe Victoria (or an equivalent electrical safety authority).

1.2 PROPOSED MODIFICATIONS TO TESTING PROCEDURE

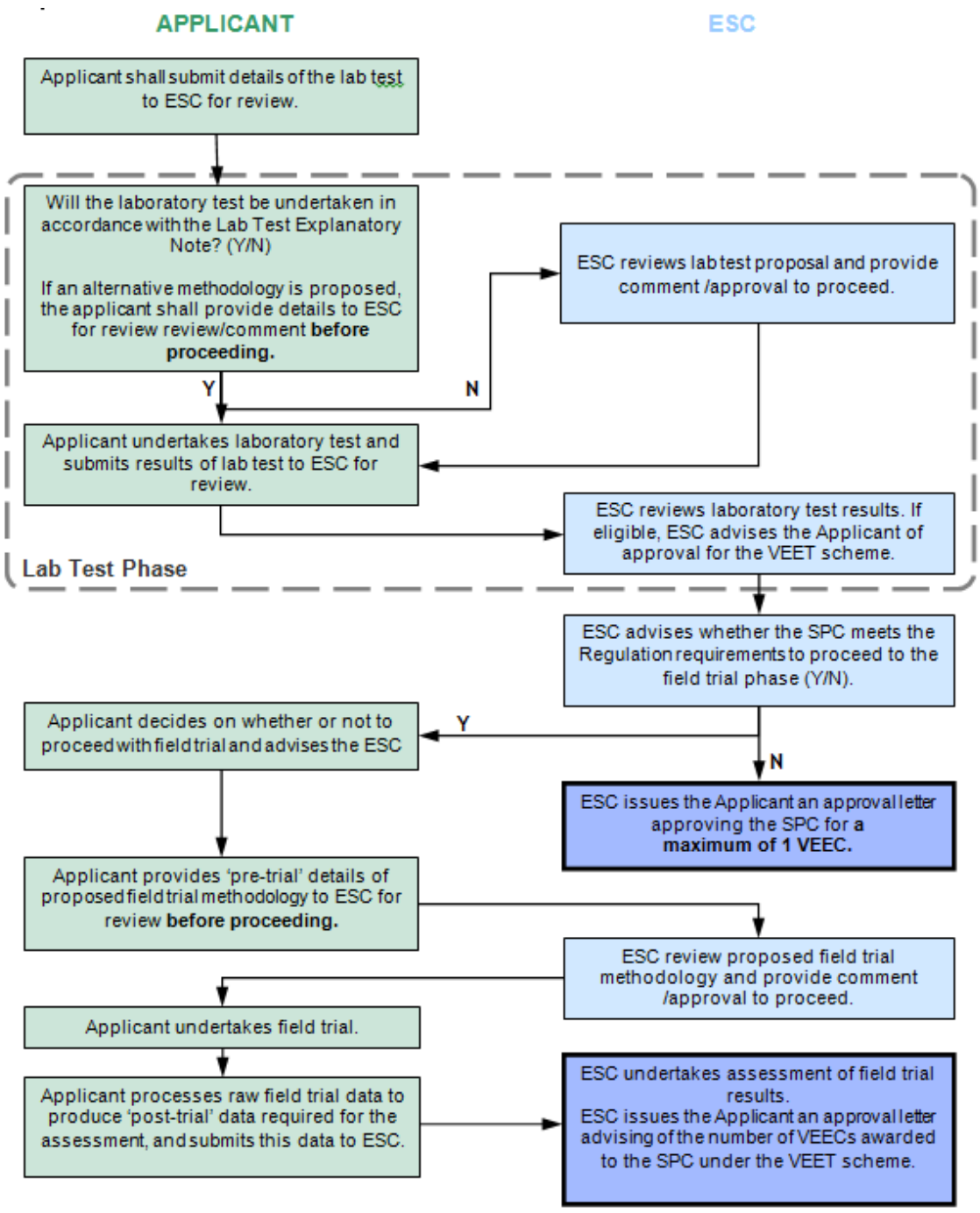
SPCs are relatively new devices designed to achieve energy efficiencies. They come in many different designs and operating regimes, and can be connected to many combinations of appliances. The testing and approval of SPCs for energy efficiency programs is a new discipline and formulating a robust and repeatable test methodology, suited to all possible SPC designs and operating environments, is challenging.

The ESC welcomes suggestions from laboratories, SPC suppliers or other parties on how this testing might be improved. The ESC reserves the right to modify test procedures at any time.

2 VEET SCHEME APPLICATION PROCESS FOR SPCS

The VEET scheme application process for SPCs is presented as a flow-chart in Figure **1** below:

Figure 1: **Flow Chart of VEET Scheme Application Process for SPCs:**



3 REFERENCED DOCUMENTS

The following documents are referenced in this test:

- AS/NZS 62301-2005 - Household Electrical Appliances – Measurement of Standby Power.
- US Energy Star Program Requirements for Computers, Version 5.2[1].

4 DEFINITIONS

AS/NZS	Australia/New Zealand (Standard)
AV	The audio-visual environment covers a TV and associated peripheral devices that may be controlled by an AV SPC. These could include items such as amplifiers, receivers, DVD players, set-top boxes etc.
AV SPC	Standby power controller for use in an audio visual environment
Controlled appliance (or controlled peripheral)	An appliance (connected to the controlled outlet of an SPC) which has its electrical power connected and disconnected automatically by the SPC
ESC	Essential Services Commission
ESV	Energy Safe Victoria
Idle (active standby) mode	Device switched ON but (where applicable) not undertaking its primary function, e.g. DVD player ”ON” but not playing a DVD, stereo on but not playing music, etc.
In-use mode	Device switched ON and undertaking its primary function, e.g. DVD player playing a DVD, stereo playing music, TV projecting moving images, etc.
IT	The information technology environment covers a computer and associated peripheral devices that may be controlled by an IT SPC. These could include items such as printers, modems, scanners, etc.
IT SPC	Standby power controller for use in an information technology environment
LCD	Liquid crystal display
Master appliance	An appliance (connected to the master outlet of a SPC) whose power consumption is used to determine whether the electrical power to the controlled appliances should be connected and disconnected by the SPC. As opposed to the principal appliance defined below.
Master/slave	A SPC operating regime relying on a master appliance and controlled appliances
NATA	National Association of Testing Authorities
Pairing	Setup such that the SPC simply switches the connected appliances “ON and “OFF” based on the operation of a single existing remote control button which the SPC is required paired during the initial commissioning

[1] Available from http://www.energystar.gov/index.cfm?c=product_specs.pt_product_specs

Passive standby mode	Device ready to be switched ON by a remote control.
Peripheral	An appliance connected to a computer, such as display, printer, scanner, speakers, etc.
Power	Real power, measured in Watts
Principal appliance	The principal appliance will either be the Television (TV) in the audio-visual environment, or the Computer in the information technology environment. This term is used irrespective of whether the SPC is a Master/Slave or Smart IR type SPC.
Sleep mode	Device switched on but not undertaking its primary function and in a mode that is readily switched back to “in use” mode.
SPC	Standby power controller
the Regulations	*Victorian Energy Efficiency Target Regulations 2008*
VEET	Victorian Energy Efficiency Target

5 ACCREDITATION AND STANDARDS

Electrical Authority Approval

The applicant must provide evidence that the SPC has received Electrical Authority Approval from a relevant authority (ESV etc.), as detailed in Section 9 of this explanatory note.

Testing Laboratory

The laboratory test shall be undertaken by a third party, independent to the SPC manufacturer, supplier and VEET proponent.

Tests may only be undertaken by independent test laboratories that are NATA accredited to ISO/IEC 17025 for testing in areas such as electronic equipment, energy efficiency of appliances, power or similar. However, it is preferable that the facility be NATA accredited to AS/NZS 62301-2005 Household Electrical Appliances – Measurement of Standby Power.

Testing Equipment

The power meters used in the laboratory tests must meet the accuracy requirements of AS/NZS 62301 Clause 4.4, 2% or better.

General Conditions

The general conditions for all tests, including the test room, power supply, voltage waveform, power measurement accuracy, and the selection and preparation of appliances and equipment, shall be performed in accordance with AS/NZS 62301-2005, Household Electrical Appliances – Measurement of Standby Power.

One sample of each SPC model, selected at random by an independent party (for example, the test house) shall be tested. For master/slave SPCs intended for use in both IT and AV environments, the tests for both types of devices (Sections 6 and 7) shall be performed.

It is a requirement that all tests are discussed with ESC before testing is undertaken, in order to ensure that testing is suitable for the SPC in question.

6 TEST FOR IT SPC

6.1 SETUP

Definitions of computer types and operating modes are as per the US Energy Star Program Requirements for Computers, Version 5.2.

The SPC should be set up and connected to the master computer, as directed by the SPC manufacturer's instructions. The SPC shall have default factory settings enabled.

The SPC shall be tested with a minimum of 6 different master computers, including the following:

1. Notebook computer (Windows based, battery installed and fully charged, connected to power supply or dock).
2. Notebook computer (Windows based, battery installed and flat, connected to power supply or dock).
3. Notebook computer (Apple based, battery installed and fully charged, connected to power supply or dock).
4. Notebook computer (Apple based, battery installed and flat, connected to power supply or dock).
5. Desktop computer (Windows based).
6. Desktop computer (Apple based).

All computers used in the testing shall be no more than 2 years old at the time of testing.

The master computer and the SPC should be connected to a minimum of 4 controlled peripherals, connected and setup as directed by the respective manufacturers' instructions. Peripheral appliances should be selected to simulate conditions that the SPC might be connected to in a real world situation, for example printer(s), speakers, scanner, display, etc.

Mains power meters shall be placed at the following locations:

- Upstream: at the SPC mains head plug (male plug), in order to measure the total power of the installation, including the SPC itself, the master computer, the connected peripherals, and the parasitic consumption (if any) of the (downstream) power meters.
- Downstream: at the master computer power lead.
- Downstream: at the power leads of controlled peripheral appliances[2].

[2] Note: for an SPC with only one controlled power outlet, it is sufficient to connect only one power meter to measure the power of all controlled peripherals. For an SPC with more than one controlled power outlet, all peripherals can be connected, via a separate power board, such that all peripherals are powered via a single controlled SPC outlet, and the sum of their power is read by only one power meter at this outlet.

This setup is in order to allow the average power consumption of the SPC (while controlled devices are off) to be calculated, which may require the parasitic consumption (if any) of the (downstream) power meters to be subtracted. Please see Appendix E for a schematic diagram of the suggested test setup.

6.2 TESTING

All test data should be logged at one second intervals throughout the test process to enable the production of the relevant time-history plots and records shall be kept for verification purposes.

The following test is used to determine the switching performance of an IT SPC:

1. First Active State test:
    a) Setup as per above.
    b) Boot the master computer and allow it to reach Idle State with steady state power.
    c) Turn on all peripherals and allow them to reach steady state power. A correctly-functioning SPC should provide immediate power to all peripherals.
    d) Commence operating the master computer for a minimum of 10 minutes in Active State by performing a series of short tasks such as opening, closing and saving files.
    e) Whilst continuing Active State operation, log power reading of each power meter at one second intervals. Using this data, calculate the instantaneous power consumption of the SPC. Average this data over 10 minutes to calculate the average power consumption of the SPC when on Active state of operation.
    f) Perform this test a minimum of 3 times and record all results. See “Test Report” section below for reporting requirements.
2. Off Mode test:
    a) After at least 10 minutes of Active State operation, allow the master computer to enter Idle State and then force it to enter Off Mode.
    b) Record the time delay for the SPC to disconnect power to the peripheral appliances (if at all) from the time at which the computer enters Off Mode.
    c) Two minutes after the SPC has disconnected power to the peripheral appliances, log power reading of each power meter at one second intervals. Using this data, calculate the instantaneous power consumption of the SPC. Average over 10 minutes to calculate the average power consumption of the SPC when peripherals are OFF.
    d) Perform this test a minimum of 3 times and record all results. See “Test Report” section below for reporting requirements.
3. Second Active State Test:
    a) Force the master computer to again enter Active State.
    b) Record the time delay for the SPC to reconnect power to the peripheral appliances (if at all) from the time at which the computer re-enters Active State.

c) Perform this test a minimum of 3 times and record all results. See “Test Report” section below for reporting requirements.

4. For SPCs with an override switch (which allows peripheral appliances to be reconnected after disconnection by the SPC), test that the override switch correctly functions, and that it resets to the non-override position when the master computer is switched off and back on again.

All tests listed above are then repeated for all computer types listed above in the section titled “Setup”.

6.3 MAINS POWER SWITCHING DEVICE

It is a condition of the Regulations that SPCs are fitted with a mains power switching device or device that is rated to a minimum of 50,000 electrical and mechanical open/close switching cycles.

The SPC shall be supplied to the test laboratory with its corresponding mains power switching device specification sheet, and the laboratory shall check the following:

1. The mains power switching device specification sheet confirms that the mains power switching device (or similar) is rated to a minimum of 50,000 electrical and mechanical open/close switching cycles.
2. A test report or test certificate confirms compliance of the switching device to the appropriate standard (e.g. EN61810-10) for a minimum of 50,000 cycles.

6.4 TEST REPORT

Please report all test data using the recommended reporting template. The following should be recorded in the test report:

1. Details of all equipment used, including calibration dates.
2. Details of all appliances used, including manufacture dates.
3. A time series graph of all logged data (based on one second measurement intervals) which is representative of the operation of the SPC, and shows the following:
   a) The operating mode of the master computer.
   b) SPC switching events.
4. Pass/fail results (and the details of any failures) against each of the following:
   a) For all tests performed, the SPC disconnected mains power from the peripherals within 2 minutes of the master computer entering Off Mode (or for a master laptop computer with a flat battery, within 2mins from the time that the battery had finished charging).
   b) For all tests performed, the SPC reconnected mains power to the peripherals within 10 seconds of the master computer re-entering Active State from Off Mode (or for a master laptop computer with a flat battery, within 3 minutes).

c) Apart from during the tests above, the SPC did not disconnect or reconnect mains power at any other time.

d) At all times, the SPC did not exhibit unexpected or perverse behaviours.

e) For SPCs with an active override switch supplied power the peripherals when the master computer was switched ON, and power to the peripherals automatically turned off when the master computer enters OFF Mode.

f) For SPCs with an override switch (which allows peripheral appliances to be reconnected after disconnection by the SPC), test that the override switch correctly functions, and that it resets to the non-override position when the master computer is switched off and back on again.

g) The average power consumption of the SPC was observed to be 1 Watt (±0.2 Watts) or less at times when the controlled devices are switched "OFF" by the SPC. Report the average power consumption of the SPC when the controlled devices are "ON".

h) At all times, the SPC was observed to conform to the Minimum Eligibility Criteria found in Schedule 29 of the VEET Regulations.

i) The "Mains Power Switching Device" check confirmed that the mains power switching device is rated to a minimum of 50,000 electrical and mechanical open/close switching cycles (tested to 50,000 switching cycles), and that the mains power switching device fitted to the SPC matches the mains power switching device specification sheet.

5. At any time, did the SPC exhibit any odd or unexpected behaviour that may affect the safety or performance of the SPC? Additionally, were there any deviations from the test method, and/or suggestions for improvement of the test method?

7 TEST FOR AV SPC – MASTER/SLAVE TYPE

This section is for testing of AV SPCs which rely on the television as the master appliance, to switch appliances such as DVD player, games console, cable box, etc.

7.1 SETUP

The SPC should be set up and connected to the master television, as directed by the SPC manufacturer's instructions. The SPC shall have default factory settings enabled.

The SPC shall be tested with a minimum of 8 different master televisions, including the following:

1. Plasma screen ≤ 42 inch, from 2 different manufacturers (with remote control).
2. Plasma screen > 42 inch, from 2 different manufacturers (with remote control).
3. LCD screen ≤ 42 inch, from 2 different manufacturers (with remote control).
4. LCD screen > 42 inch, from 2 different manufacturers (with remote control).

The SPC should be connected to a minimum of 4 controlled AV appliances at one time (e.g. DVD player, games console, satellite box, etc.)

All appliances shall be no more than 2 years old at the time of testing. Connect all appliances as directed by the respective manufacturers' instructions.

Mains power meters shall be placed at the following locations:

- Upstream: at the SPC mains head plug (male plug), in order to measure the total power of the installation, including the SPC, the master television, the controlled appliances, and the parasitic consumption (if any) of the (downstream) power meters.
- Downstream: at the master device power lead.
- Downstream: at the power leads of all controlled appliances[3].

This setup is in order to allow the net power consumption of the SPC to be calculated, which will require the parasitic consumption (if any) of the (downstream) power meters to be subtracted. Please see Appendix E for a schematic diagram of the suggested test setup.

7.2 TESTING

All test data should be logged at one second intervals throughout the test process to enable the production of the relevant time-history plots and records shall be kept for verification purposes.

The following test is used to determine the switching performance of a master/slave AV SPC:

1. First On Mode test:
    a) Setup as per above.
    b) Turn on the master device (in this case the television) and allow it to reach steady state power.
    c) Turn on all appliances and allow them to reach steady state power. Note that a correctly-functioning SPC should provide immediate power to all appliances.
    d) After a period of approximately 2 minutes, record the reading of each power meter at 1 second interval. Using this data, calculate the instantaneous power consumption of the SPC. Average this data over 10 minutes to calculate the average power consumption of the SPC when on Active state of operation.
    e) Perform this test a minimum of 3 times and record all results. See section 6.4 for reporting requirements.

[3] Note: for an SPC with only one controlled power outlet, it is sufficient to connect only one power meter to measure the power of all controlled appliances. For an SPC with more than one controlled power outlet, all controlled appliances can be connected, via a separate power board, such that they are powered via a single controlled SPC outlet, and the sum of their power is read by only one power meter at this outlet.

2. Off Mode test:
    a) After at least 10 minutes of television operation in On Mode, switch off the television using its remote control.
    b) Record the time delay for the SPC to disconnect power to the controlled appliances (if at all) from the time at which the television is switched off.
    c) Two minutes after the SPC has disconnected power to the appliances, log power reading of each power meter at one second intervals. Using this data, calculate the instantaneous power consumption of the SPC. Average over 10 minutes to calculate the average power consumption of the SPC when peripherals are OFF.
    d) Perform this test a minimum of 3 times and record all results. See section 6.4 for reporting requirements.
3. Second On Mode Test:
    a) Turn on the television again using its remote control.
    b) Record the time delay for the SPC to reconnect power to the controlled appliances (if at all) from the time at which the television is turned on.
    c) Perform this test a minimum of 3 times and record all results. See "Test Report" section below for reporting requirements.
4. For SPCs with an override switch (which allows peripheral appliances to be reconnected after disconnection by the SPC), test that the override switch correctly functions, and that it resets to the non-override position when the Principal Appliance is switched off and back on again.

All tests listed above are then repeated for all television types listed above in the section titled 'Setup'.

5. Television power drop test:
    a) To simulate a plasma screen transitioning to black screen, install a dummy load of 450W in place of the television and ensure controlled appliances are powered.
    b) Switch the 450W load instantaneously to 150W and leave this load connected for 10 minutes. Ensure that the SPC does not switch off the controlled appliances.

7.3 MAINS POWER SWITCHING DEVICE

It is a condition of the Regulations that SPCs are fitted with a mains power switching device that is rated to a minimum of 50,000 electrical and mechanical open/close switching cycles. It is a requirement that this is confirmed though testing by simulating 50,000 switching cycles.

The SPC shall be supplied to the test laboratory with its corresponding mains power switching device specification sheet, and the laboratory shall check the following:

- The mains power switching device specification sheet confirms that the mains power switching device is rated to a minimum of 50,000 electrical and mechanical open/close switching cycles; and,

- A test report or test certificate confirms compliance of the switching device to the appropriate standard (e.g. EN61810-10) for a minimum of 50,000 cycles.

7.4 TEST REPORT

Please report all test data using the recommended reporting template. The following should be recorded in the test report:

1. Details of all equipment used, including calibration dates.
2. Details of all appliances used, including manufacture dates.
3. A time series graph which is representative of the operation of the SPC, and shows the following:
   a) The operating mode of the master television.
   b) SPC switching events.
4. Pass/fail results (and the details of any failures) against each of the following :
   a) For all tests performed, the SPC disconnected mains power from the controlled appliances within 2 minutes of the master television being turned off.
   b) For all tests performed, the SPC reconnected mains power to the controlled appliances within 10 seconds of the master television being turned on again.
   c) Apart from during the tests above, the SPC did not disconnect or reconnect mains power at any other time.
   d) At all times, the SPC did not exhibit unexpected or perverse behaviours.
   e) For SPCs with an override switch (which allows peripheral appliances to be reconnected after disconnection by the SPC), test that the override switch correctly functions, and that it resets to the non-override position when the principal appliance is switched off and back on again.
   f) During the Television Power Drop Test, the controlled appliances remained powered at all times.
   g) The average power consumption of the SPC was observed to be 1 Watt (±0.2 Watts) or less at times when the controlled devices are switched “OFF” by the SPC. Also report power consumption of the SPC when the controlled devices are “ON”
   h) At all times, the SPC was observed to conform to the Minimum Eligibility Criteria found in Schedule 29 of the VEET Regulations.
   i) The Mains Power Switching Device check (section 6.3) confirmed that the mains power switching device is rated to a minimum of 50,000 electrical and mechanical open/close switching cycles (tested to 50,000 switching cycles), and that the mains power switching device fitted to the SPC matches the mains power switching device specification sheet.
5. At any time, did the SPC exhibit any odd or unexpected behaviour that may affect the safety or performance of the SPC? Additionally, were there any deviations from the test method, and/or suggestions for improvement of the test method?

8 TEST FOR AV SPC – IR TYPE

This section is for testing of AV SPCs which do not rely solely on a master appliance, but rely (solely or additionally) on sensing of infra-red signals from existing AV remote controls (without pairing to an existing remote control button), in order to sense user requirements for the AV installation to be turned on or off.

SPCs which use differing operating regimes, from IR sensing, may require a different type of test. The ESC should be consulted prior to undertaking different types of testing.

8.1 SETUP

The SPC should be set up and connected to AV appliances as directed by the SPC manufacturer's instructions. The SPC shall have default factory settings enabled.

The SPC shall be tested with a minimum of 8 different master televisions, including the following:

1. Plasma screen ≤ 42 inch, from 2 different manufacturers (with remote control).
2. Plasma screen > 42 inch, from 2 different manufacturers (with remote control).
3. LCD screen ≤ 42 inch, from 2 different manufacturers (with remote control).
4. LCD screen > 42 inch, from 2 different manufacturers (with remote control).

The SPC should be connected to a minimum of 4 controlled AV appliances at one time (e.g. television, DVD player, games console, etc.) including at least one cable or satellite box (which can exhibit different remote control behaviours from other AV appliances).

All connected appliances must have a separate remote control. All appliances shall be no more than 2 years old at the time of testing.

Mains power meters shall be placed at the following locations:

- Upstream: at the SPC mains head plug (male plug), in order to measure the total power of the installation, including the SPC and all connected appliances, and the parasitic consumption of the (downstream) power meters.
- Downstream: at the power leads of all connected appliances[4].

[4] Note: for an SPC with only one controlled power outlet, it is sufficient to connect only one power meter to measure the power of all controlled appliances. For an SPC with more than one controlled power outlet, all controlled appliances can be connected, via a separate power board, such that they are powered via a single controlled SPC outlet, and the sum of their power is read by only one power meter at this outlet.

This setup is in order to allow the net power consumption of the SPC to be calculated, which will require the parasitic consumption (if any) of the (downstream) power meters to be subtracted. Please see Appendix E for a schematic diagram of the suggested test setup.

8.2 TESTING

All test data should be logged at one second intervals throughout the test process to enable the production of the relevant time-history plots and records shall be kept for verification purposes.

The following test is used to determine the switching performance of an AV SPC (IR Type):

1. First On Mode test:
    a) Setup as per above.
    b) Turn on all connected appliances using their respective remote controls. Note that a correctly-functioning SPC should provide immediate power to all appliances.
    c) After all appliances reach steady state power, record the power reading of each power meter at 1 second intervals. Using this data, calculate the instantaneous power consumption of the SPC. Average this data over 10 minutes to calculate the average power consumption of the SPC when controlled appliances are ON.
    d) Perform this test a minimum of 3 times and record all results. See “Test Report” section below for reporting requirements.
2. Off Mode tests:
    a) After at least 10 minutes of television operation in On Mode, switch off the television using its remote control.
    b) Record the time delay for the SPC to disconnect power to the controlled appliances (if at all) from the time at which the television is switched off.
    c) Two minutes after the SPC has disconnected power to the appliances, log power reading of each power meter at one second intervals. Using this data, calculate the instantaneous power consumption of the SPC. Average over 10 minutes to calculate the average power consumption of the SPC when peripherals are OFF. See “Test Report” section below for reporting requirements.
    d) Switch back “ON” all appliances. Then operate each appliance’s remote control in turn, from at least 6 metres away from the SPC IR sensor, at 30 second intervals, for a period of 12 minutes. Choose functions at random such as adjust volume control, change channel, play disc, etc. but not on/off.
    e) Cease operation of all remote controls.
    f) From this point, record the time taken for the SPC to disconnect power to the appliances (if at all)
    g) Cease the test after 2.5 hours.

h) Perform this test a minimum of 3 times and record all results. See “Test Report” section below for reporting requirements.

3. Second On Mode test:
   a) Perform this test after the Off Mode test, with SPC having disconnected power to all appliances.
   b) Operate each appliance’s remote control (ensure cable or satellite box is included) from at least 6 metres away from the SPC IR sensor. Choose functions at random such as adjust volume control, change channel, play disc, etc. but not on/off.
   c) Determine if the operation of each appliance’s remote control causes reconnection of power to appliances. Note that this will require an SPC disconnection after each reconnection.
   d) Perform this test a minimum of 3 times and record all results. See ‘Test Report’ section below for reporting requirements.
4. For SPCs with an override switch (which allows peripheral appliances to be reconnected after disconnection by the SPC), test that the override switch correctly functions, and that it resets to the non-override position when the Principal Appliance is switched off and back on again.

All tests listed above are then repeated for all television types listed above in the section titled ‘Setup’.

5. Television power drop test:
   a) To simulate a plasma screen transitioning to black screen, install a dummy load of 450W in place of the television and ensure controlled appliances are powered.
   b) Switch the 450W load instantaneously to 150W and leave this load connected for 10 minutes. Ensure that the SPC does not switch off the controlled appliances.

8.3 MAINS POWER SWITCHING DEVICE

It is a condition of the Regulations that SPCs are fitted with a mains power switching device that is rated to a minimum of 50,000 electrical and mechanical open/close switching cycles. It is a requirement that this is confirmed though testing by simulating 50,000 switching cycles.

The SPC shall be supplied to the test house with its corresponding mains power switching device specification sheet, and the laboratory shall check the following:

1. The mains power switching device specification sheet confirms that the mains power switching device is rated to a minimum of 50,000 electrical and mechanical open/close switching cycles; and,
2. A test report or test certificate confirms compliance of the switching device to the appropriate standard (e.g. EN61810-10) for a minimum of 50,000 cycles.

8.4 TEST REPORT

Please report all test data using the recommended reporting template. The following should be recorded in the test report:

1. Details of all equipment used, including calibration dates.
2. Details of all appliances used, including manufacture dates.
3. An approximate time series graph which is representative of the operation of the SPC, and shows the following:
    a) Remote control switching events and other inputs used to control the SPC.
    b) SPC switching events.
4. Pass/fail results (and details of any failures) against each of the following:
    a) For all tests performed, the SPC disconnected mains power from the controlled appliances within 2 minutes of the principal television being turned off.
    b) For all tests performed, the SPC disconnected mains power to the controlled appliances in the manner outlined by the SPC manufacturer (e.g. after a period of time without any remote control IR activity).
    c) For all tests performed, the SPC reconnected mains power to the controlled appliances in the manner outlined by the manufacturer (e.g. after remote control IR activity from each appliance's remote control).
    d) Apart from during the tests above, the SPC did not disconnect or reconnect mains power at any other time.
    e) For all tests performed, the SPC did not exhibit unexpected or perverse behaviours.
    f) For SPCs with an override switch (which allows peripheral appliances to be reconnected after disconnection by the SPC), test that the override switch correctly functions, and that it resets to the non-override position when the principal appliance is switched off and back on again.
    g) During the Television Power Drop Test, the controlled appliances remained powered at all times.
    h) The average power consumption of the SPC was observed to be 1 Watt (±0.2 Watts) or less at times when the controlled devices are switched "OFF" by the SPC. Also report power consumption of the SPC when the controlled devices are "ON".
    i) At all times, the SPC was observed to conform to the Minimum Eligibility Criteria found in Schedule 29 of the VEET Regulations.
    j) The "Mains Power Switching Device" check confirmed that the mains power switching device is rated to a minimum of 50,000 electrical and mechanical open/close switching cycles, and that the mains power switching device fitted to the SPC matches the mains

power switching device specification sheet. Also, confirmation of the rated switching cycles though a laboratory test is a requirement.

5. At any time, did the SPC exhibit any odd or unexpected behaviour that may affect the safety or performance of the SPC? Additionally, were there any deviations from the test method, and/or suggestions for improvement of the test method?

9 DATA TO BE PROVIDED TO THE ESC

The following section details the key data that must be provided to the ESC following the laboratory test. This data will allow the ESC to undertake a review to determine if the SPC is eligible for the VEET Scheme. This data can be summarised as follows:

1. Laboratory Test Report Cover Sheet
2. Details of the SPC
3. Electrical Authority Approval
4. Appropriate Test Report Summary Sheet
5. Test Configuration Diagram
6. Testing Details
7. Time Series Data and Plots
8. Photographs of the tested SPC

Each of these items is described in detail below, and a summary checklist of items required for submission is provided in Appendix F.

9.1 LABORATORY TEST REPORT COVER SHEET

Please refer to Appendix A of this explanatory note for a “Laboratory Test Report Cover Sheet” pro forma.

9.2 DETAILS OF THE SPC

In addition to the details provided on the Laboratory Test Report Cover Sheet, the following details of the SPC must be provided:

- A description of the SPC and its functionality (e.g. a description of the control strategy that the SPC employs – duration to shutoff etc.).
- Details of the power load ratings that are used to govern the switching functions of the SPC (if applicable).
- A schematic circuit diagram

- Bill of materials, including a list of any alternative components.
- Test Report and/or Certificate for the 50,000 switching cycle test of the Mains Power Switching Device, including any additional reports required where alternative components are proposed.
- The maximum power load rating for the Principal Appliance Outlet (in Watts).
- The maximum power load rating of the combined peripheral outlets (in Watts).
- Details of any limitations to the operating power range of the SPC functionality (minimum and maximum power load limits etc.).
- Details of any appliances that are known to be incompatible with the SPC.

9.3 ELECTRICAL AUTHORITY APPROVAL

The applicant must provide evidence that the SPC has received Electrical Authority Approval from a relevant authority (ESV etc.).

9.4 APPROPRIATE TEST REPORT SUMMARY SHEET

Please complete the appropriate Test Report Summary sheet for the SPC tested. These can be found in the following Appendices:

Appendix B: IT SPC - Master / Slave type

Appendix C: AV SPC - Master / Slave type

Appendix D: AV SPC – IR type

9.5 TEST CONFIGURATION DIAGRAM

For each test conducted, provide a diagram showing the configuration of power meters and household appliances. Examples diagrams for the IT and AV scenarios are provided in Appendix E.

9.6 TESTING DETAILS

The following details of testing equipment, appliances used etc. are required.

Testing Equipment

Details of all testing equipment (e.g. power meters) shall be provided. The location of each of these items on the configuration diagram is also required. Details required are as follows:

- Type
- Brand
- Model

- Serial No.
- Calibration Date

Appliances

The details of each appliance used and their location in the configuration diagram should also be included. Details required are as follows:

- Type
- Brand
- Model
- Serial No.
- Date of Manufacture, or if unavailable, date of purchase
- Voltage

Master / Slave Configurations

For master slave arrangements the following details are also required for each configuration tested:

IT

- Master/ Slave
- Desktop/ Notebook
- Battery charged/ Battery flat
- Windows/ Apple

AV

- Master/ Slave
- Plasma/ LCD
- ≤ 42 inch/ >42 inch

9.7 TIME SERIES DATA AND PLOTS

For each test, please submit one time series data set AND one time series plot (power vs. time).

Please ensure that all data sets are supplied in MS Excel data files with clearly labelled column headings stating the parameter recorded and the measurement units.

Furthermore, the plots supplied must present the output from each power meter, thereby showing the power consumption of each device, the total power consumption of the system and the SPC power consumption.

These graphs should show the SPC switching events and either:

1. the operating mode of the master computer
2. the operating mode of the master television

OR

3. the remote control switching events and other inputs used to control the SPC as appropriate.

9.8 PHOTOGRAPHS OF THE TESTED SPC

The SPC provided for assessment shall be photographed as a visual record of:

- External appearance and construction
- Model number, power ratings and other external markings
- Internal construction
- Internal components
- Switching assembly

Photographs must be of sufficient quality to enable identification of the above items, markings and component / model numbers.

APPENDIX A: LABORATORY TEST REPORT COVER SHEET

Victorian Energy Efficiency Target (VEET) Standby Power Controller (SPC)

LABORATORY TEST REPORT

SPC Type: **IT/ AV/ AV-IR** (Please circle)

If the SPC is for both AV and IT environments, please circle both IT and AV.

SPC Details
Brand:
Model:
Serial No:
Date of Manufacture:
Voltage:

Laboratory Details
Laboratory:
Accreditation:
Testing officer:
Date of test:
Name and Address of Applicant:

Summary
Has the appliance passed all requirements as laid out in the ESC Laboratory Test for Standby Power Controllers explanatory notes: **IT** YES/ NO/ Not Applicable **AV** YES/ NO/ Not Applicable **AV- IR** YES/ NO/ Not Applicable
Signature:

APPENDIX B: IT SPC – MASTER / SLAVE TYPE TEST REPORT SUMMARY

For each IT-SPC Master/ Slave tested, report on whether the following test conditions were met. Space for comments is provided. Submit graphs showing logged data for all tests. For further details on test conditions, please refer to the *Explanatory Notes - Laboratory Test for SPC* document.

Condition	Pass/ Fail	Comments
For all tests the SPC disconnected mains power from the controlled appliances within 2 minutes of the master computer entering off mode (or for a master laptop computer with a flat battery, within 2mins from the time that the battery had finished charging).		
For all tests the SPC reconnected mains power to the controlled appliances within 10 seconds of the master computer re-entering Active State from Off Mode (or for a master laptop computer with a flat battery, within 3 minutes).		
Apart from during the tests above, the SPC did not disconnect or reconnect mains power at any other time.		
For all tests performed, the SPC did not exhibit unexpected or perverse behaviours.		
For SPCs with an override switch, the override switch correctly functioned, and reset to the non-override position when the master computer is switched off and back on again.		
The average power consumption of the SPC was observed to be 1 Watt (±0.2 Watts) or less at times when the controlled devices are switched "OFF" by the SPC. Also report power consumption of the SPC when the controlled devices are "ON"		
At all times, the SPC was observed to conform to the Minimum Eligibility Criteria found in the VEET Regulations.		
The Mains Power Switching Device check confirmed that the mains power switching device is rated to a minimum of 50,000 electrical and mechanical open/close switching cycles		
The mains power switching device fitted to the SPC matches the mains power switching device specification sheet		
The rated switching cycles has been confirmed though a laboratory test		

At any time, did the SPC exhibit any odd or unexpected behaviour that may affect the safety or performance of the SPC? Additionally, were there any deviations from the test method, and/or suggestions for improvement of the test method?

APPENDIX C: AV SPC - MASTER / SLAVE TYPE TEST REPORT SUMMARY

For each AV-SPC Master/ Slave tested, report on whether the following test conditions were met. Space for comments is provided. Submit graphs showing logged data for all tests. For further details on test conditions, please refer to the *Explanatory Notes - Laboratory Test for SPC* document.

Condition	Pass/ Fail	Comments
For all tests the SPC disconnected mains power from the controlled appliances within 2 minutes of the master television being turned off.		
For all tests the SPC reconnected mains power to the controlled appliances within 10 seconds of the master television being turned on again.		
Apart from during the tests above, the SPC did not disconnect or reconnect mains power at any other time.		
For all tests performed, the SPC did not exhibit unexpected or perverse behaviours.		
For SPCs with an override switch, the override switch correctly functioned, and reset to the non-override position when the principal appliance is switched off and back on again.		
During the Television Power Drop Test, the controlled appliances remained powered at all times.		
The average power consumption of the SPC was observed to be 1 Watt (±0.2 Watts) or less at times when the controlled devices are switched “OFF” by the SPC. Also report power consumption of the SPC when the controlled devices are “ON”.		
At all times, the SPC was observed to conform to the Minimum Eligibility Criteria found in the VEET Regulations.		
The Mains Power Switching Device check confirmed that the mains power switching device is rated to a minimum of 50,000 electrical and mechanical open/close switching cycles.		
The mains power switching device fitted to the SPC matches the mains power switching device specification sheet.		
The rated switching cycles has been confirmed though a laboratory test.		

At any time, did the SPC exhibit any odd or unexpected behaviour that may affect the safety or performance of the SPC? Additionally, were there any deviations from the test method, and/or suggestions for improvement of the test method?

APPENDIX D: AV SPC – IR TYPE TEST REPORT SUMMARY

For each AV-SPC-IR tested, report on whether the following test conditions were met. Space for comments is provided. Submit graphs showing logged data for all tests with explanations. For further details on test conditions, please refer to the *Explanatory Notes - Laboratory Test for SPC* document.

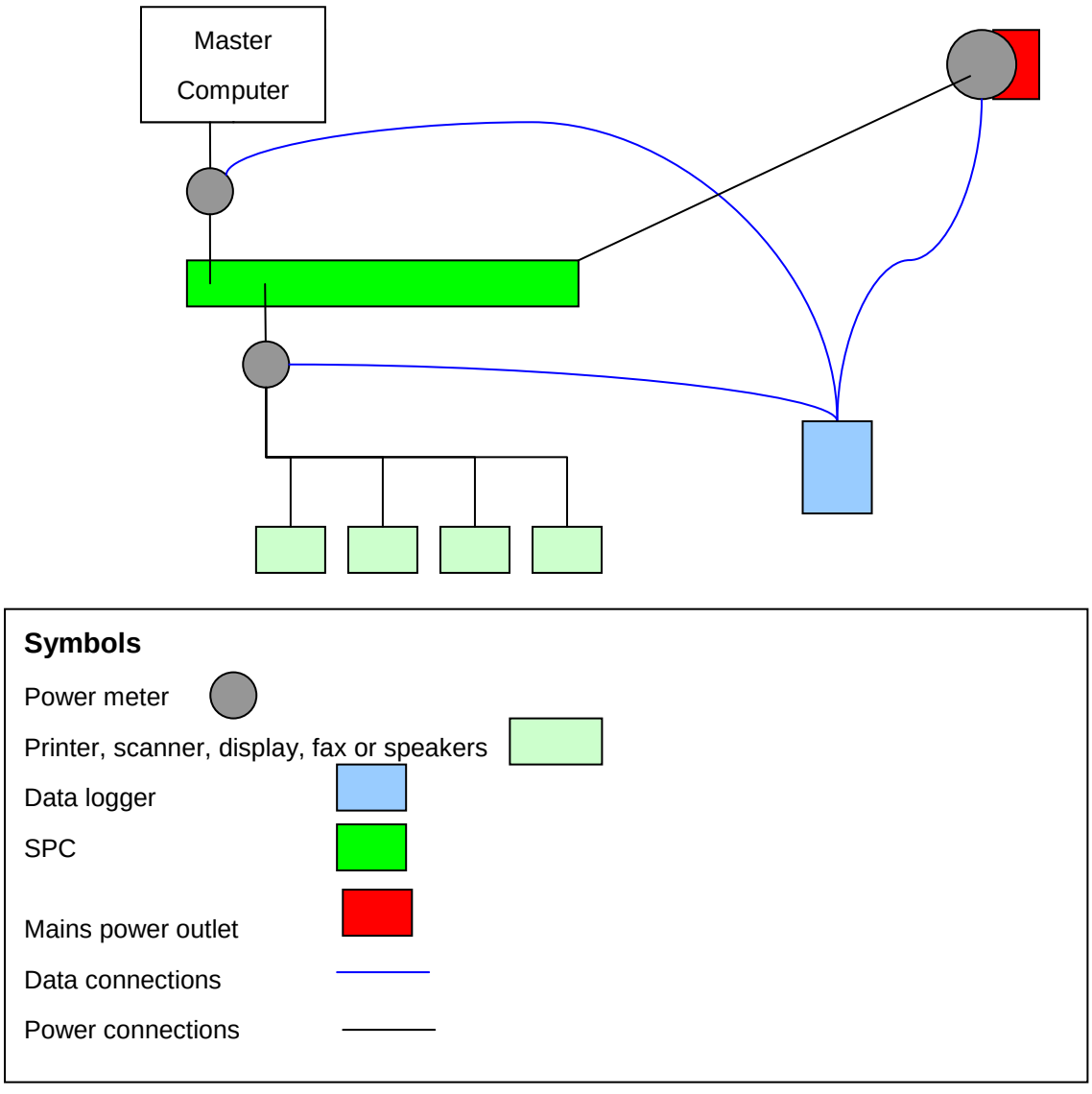
Condition	Pass/ Fail	Comments
For all tests the SPC disconnected mains power from the controlled appliances within 2 minutes of the television being turned off.		
For all tests the SPC reconnected mains power to the controlled appliances within 10 seconds of the television being turned on again.		
For all tests the SPC disconnected mains power from the appliances in the manner outlined by the SPC manufacturer.		
For all tests the SPC reconnected mains power to the appliances in the manner outlined by the manufacturer.		
Apart from during the above tests, the SPC did not disconnect / reconnect mains power at any time.		
For all tests performed, the SPC did not exhibit unexpected or perverse behaviours.		
For SPCs with an override switch, the override switch correctly functioned, and reset to the non-override position when the principal appliance is switched off and back on again.		
During the Television Power Drop Test, the controlled appliances remained powered at all times.		
The average power consumption of the SPC was observed to be 1 Watt (±0.2 Watts) or less at times when the controlled devices are switched "OFF" by the SPC. Also report power consumption of the SPC when the controlled devices are "ON".		
At all times, the SPC was observed to conform with the Minimum Eligibility Criteria found in the VEET Regulations.		
The Mains Power Switching Device check confirmed that the mains power switching device is rated to a minimum of 50,000 electrical and mechanical open/close switching cycles.		
The mains power switching device fitted to the SPC matches the mains power switching device specification sheet.		
The rated switching cycles has been confirmed though a laboratory test.		

At any time, did the SPC exhibit any odd or unexpected behaviour that may affect the safety or performance of the SPC? Additionally, were there any deviations from the test method, and/or suggestions for improvement of the test method?

APPENDIX E: TEST CONFIGURATION DIAGRAM EXAMPLES

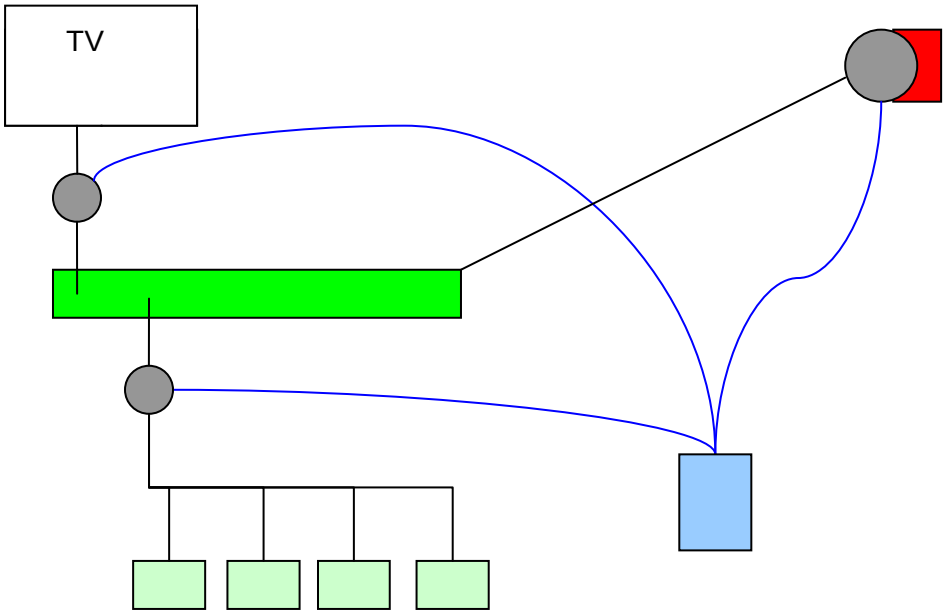
For each test conducted, provide a diagram showing the configuration of power meters and household appliances. An example diagram for IT or AV tests is provided below.

IT SPC – Example Test Configuration Diagram



Note: Parasitic power consumption of the meters (if any) to be subtracted

AV SPC – Example Test Configuration Diagram



Symbols

Power meter

DVD player, audio, games console or other AV device

Data logger

SPC

Mains power outlet

Power connections

Data connections

Note: Parasitic power consumption of the meters (if any) to be subtracted

APPENDIX F: DATA TO BE PROVIDED TO THE ESC

The “Data to be provided to the ESC” requirements have been detailed in Section 9 of this explanatory note. This appendix merely summarises the data that shall be supplied to the ESC following completion of the laboratory test. This appendix should be read in conjunction with Section 9.

Please use the below checklist as the cover sheet for the laboratory test submission to the ESC.

Data to be provided to ESC	Data Supplied (Y/N)
1. Laboratory Test Report Cover Sheet	
2. Details of the SPC	
3. Electrical Authority Approval	
4. Appropriate Test Report Summary Sheet	
5. Test Configuration Diagram	
6. Testing Details	
7. Time Series Data and Plots	
8. Photographs of the Tested SPC	

Document version history

Version	Amendments	Effective date
V 1.3	Formatting changes	7 June 2017