EIRGRID_2015 Functional Document Template (21

Battery ESPS Active Power Control Test Procedure

[Insert PPM Name]

Version 0.1

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# Document Version History

EirGrid test procedure template version published July 2021.

|  |  |  |
| --- | --- | --- |
| **Document Version History** | | |
| **Version** | **Date** | **Comment** |
| 0.1 | dd/mm/yyyy | First submission for review/approval |
| 1.0 |  |  |
|  |  |  |

# Introduction

|  |  |
| --- | --- |
| ESPS Name | ESPS to Specify  (name per connection agreement) |
| ESPS Test Coordinator and contact number: | ESPS to Specify |
| Associated 110 kV Station | ESPS to Specify |
| ESPS connection point | ESPS to Specify  (*i.e.* T121 in XXX Distribution or Transmission Station) |
| ESPS connection voltage | ESPS to Specify |
| ESPS Connection Type | ESPS to Specify  (TSO, DSO Topology 1, DSO Topology 2 etc.) |
| Installed module type, MW size and quantity | ESPS to Specify |
| Contracted MEC | ESPS to Specify |
| Contracted MIC | ESPS to Specify |
| Registered Capacity | ESPS to Specify |
| Energy Storage Capacity | ESPS to Specify |
| % Charge maintained in normal operation | ESPS to Specify |
| Limiter applied to Exported MW | ESPS to Specify |
| Limiter applied to AAP | ESPS to Specify |
| RoCoF Capability | ESPS to Specify |

## Test Execution

**PPM shall highlight any changes made to this document or approval will be void.**

The PPM shall submit the latest version of this test procedure template as published on the EirGrid website[[1]](#footnote-2).

All yellow sections shall be filled in before the test procedure shall be approved. All grey sections shall be filled in during testing. If any test requirements or steps are unclear, or if there is an issue with meeting any requirements or carrying out any steps, please contact [generator\_testing@eirgrid.com](mailto:generator_testing@eirgrid.com).

Where a site consists of two separate controllable PPM with a single connection point, this may impact on the test procedure outlined below.

The ESPS representative shall coordinate testing. On the day of testing, suitably qualified technical personnel may be needed at the ESPS to assist in undertaking the tests. Such personnel shall have the ability to fully understand the function of the ESPS and its relationship to the network to which the ESPS is connected. Furthermore, such personnel shall have the ability to set up the control system of the ESPS so as to enable Grid Code compliance test to be correctly undertaken. In addition, the function of the technical personnel is to liaise with NCC.

The availability of personnel at NCC will be necessary in order to initiate the necessary instructions for the test. NCC shall determine if network conditions allow the testing to proceed.

All battery modules shall be available. If on the day of the testing all battery modules are not available, then the test may proceed where the unavailable modules make up <20% of Registered Capacity. All test results shall be based on tested performance only and shall not be extrapolated in the case of reduced availability. Resource conditions need to be sufficient in order adequately perform the test. The ESPS should, where possible, ensure the unit has sufficient state of charge in advance of commencing testing each day. Before each test section, the state of charge of the ESPS should be checked and adjusted if required, following approval by NCC.

For all of test steps, if the change in Target MW is <15 MW, the wait time shall be 1 minute. If the change in Target MW is > 15 MW, the wait time shall be at least 2 minutes. As these larger changes in MW will have bigger impact on the transmission system, the PPM may be required to wait for longer than this before carrying out a set-point change. During the test, if the PPM output is fluctuating or has not stabilised at the “Target MW”, the wait time shall be extended as appropriate. PPM shall adjust the timing of the steps as required in order to align with this.

Throughout the test procedure, for instances where APC is OFF the TSO accepts that there may be some level of import required to manage house load in this scenario. The battery should not be discharging or charging while APC is OFF, but may import due to house load.

## Notes

If Automated Test Scripts are being used, Automated Test Scripts generated by the ESPS shall meet the following requirements:

* It must be possible to pause the script at any point.
* The MW Test Profile has been submitted and agreed in advance
* The MW Test Profile must account for timing of each step (note 1 minute is not appropriate for all steps).

Following testing, the following shall be submitted to [generator\_testing@eirgrid.com](mailto:generator_testing@eirgrid.com):

|  |  |
| --- | --- |
| **Submission** | **Timeline** |
| A scanned copy of the test procedure, as completed and signed on site on the day of testing | 1 working day |
| Test data in CSV or Excel format | 1 working day |
| Test report | 10 working days |

## Site Safety requirements

The following is required for the EirGrid witness to attend site:

|  |  |
| --- | --- |
| Personnel Protection Gear Requirements   1. Site Safety boots 2. Hard Hat with chin strap 3. Hi Vis 4. Arc Resistive clothing 5. Safety Glasses 6. Gloves 7. Safe Pass | 1. Yes / No 2. Yes / No 3. Yes / No 4. Yes / No 5. Yes / No 6. Yes / No 7. Yes / No |
| Site Induction requirements | Yes / No  (If Yes, PPM to specify how and when the induction shall be carried out) |
| Any further information | PPM to specify |

# Abbreviations

AAP Available Active Power

APC Active Power Control

DMOL Designed Minimum Operating Level

ESPS Energy Storage Power Station

HV High Voltage

MEC Maximum Export Capacity

MIC Maximum Import Capacity

MW Mega Watt

NCC National Control Centre

PN Physical Notification

PPM Power Park Module

SLD Single Line Diagram

TSO Transmission System Operator

# Grid Code References

|  |  |
| --- | --- |
| Grid Code Version: | ESPS to specify |
| Please also refer to the published Battery ESPS Grid Code Implementation Note[[2]](#footnote-3) for guidance on technical requirements for Battery ESPS and applicability of specific PPM clauses within the Grid Code. |  |

# Test description and pre conditions

## Purpose of the Test

The purpose of this test is to demonstrate the Active Power Control functions of the ESPS, including ramp rates applied. This test procedure also includes verification of house load and battery capacity. Availability signals are recorded during this test and should be assessed in the test report.

## Pass Criteria

The following is the pass criteria for the test. Any subsequent report for this test shall be assessed against each of these criteria.

| **Criteria** |
| --- |
| **Active Power Control** |
| Active Power export and import is limited to the MEC and MIC of the ESPS respectively |
| ESPS Control System receives all online Active Power Control Set-points, commences implementation of all set-points within 10 seconds of receipt and provides the correct set-point feedback |
| When APC is ON, ESPS regulates its active power output to within the greater of (±0.5 MW or ±3% of Registered Capacity) of the Active Power Control Set-point |
| ESPS Control System operates each battery module at a reduced level while operating at a reduced output, greater than DMOL |
| ESPS does not respond to any set-points sent while Active Power Control is OFF |
| **Ramp Rates** |
| Rate of change of output is equal to the Active Power Control Set-point Ramp Rate when ramping to Active Power Control Set-points greater than or equal to DMOL, with temporary deviations not exceeding ±3% of Registered Capacity |
| ESPS output ramps to 0MW at the Active Power Control Ramp Rate when Active Power Control is turned OFF (unless acting under Frequency Response Ramp Rate or Capacity Limited Ramp Rate) |
| Demonstration that the Capacity Limited Ramp Rate and Active Power Control Set-point Ramp Rate can each be set independently over a range between 1% and 100% of Registered Capacity per minute |
| **Battery Signals** |
| Available active power export and import signals are limited to the MEC and MIC of the ESPS respectively |
| Available active power export and import signals behave correctly when the unit is issued an APC set-point or is providing a frequency response |
| Useable Energy Remaining signal provides real time quantity of energy (MWHr) that the unit is capable of exporting, based on current state of charge. |
| Total Useable Storage Capacity signal provides real-time quantity of energy (MWHr) that the unit is capable of importing, based on current state of charge. |
| ESPS Charging and Discharging Signals correctly determine if the ESPS is charging or discharging |
| **House Load** |
| Completion of house load verification |
| **Capacity/Max On Time** |
| ESPS Demonstration of Capacity ( Registered Characteristic / Technical Offer Data value) |

## Instrumentation and onsite data trending

All of the following trends shall be recorded by the ESPS during the test. The ESPS may capture any other signals as necessary to demonstrate compliance.

The ESPS shall specify the resolution of these signal recordings. As a minimum the resolution should be as specified in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | **Data Trending and Recording** | **Resolution** | **Check On Day Of Test** |
| 1 | Available active power export (MW) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 2 | Available active power import (MW) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 3 | Actual active power (MW) | PPM to specify, ≥ 1 Hz | Yes / No |
| 4 | APC (ON/OFF) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 5 | APC set-point from NCC (MW) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 6 | ESPS Frequency Response (ON/OFF) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 7 | ESPS Reserve Response Mode (1 - 5) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 8 | ESPS Active Trigger Frequency Setting (Hz) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 9 | ESPS Active Trajectory Setting (Hz) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 10 | ESPS Active Maximum under frequency response setting (MW) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 11 | ESPS Active Maximum over frequency response setting (MW) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 12 | Grid Frequency (Hz) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 13 | ESPS Local/Manual Control (ON/OFF) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 14 | ESPS Grid/TSO Control (ON/OFF) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 15 | ESPS Useable Energy Remaining (MWh) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 16 | ESPS Total Useable Storage Capacity (MWh) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 17 | FFR Availability (MW) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 18 | POR Availability (MW) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 19 | SOR Availability (MW) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 20 | TOR1 Availability (MW) | PPM to Specify (≥ 1 Hz) | Yes / No |
| 21 | TOR2 Availability (MW) | PPM to Specify (≥ 1 Hz) | Yes / No |

## Ramp Rate Calculations

|  |  |
| --- | --- |
| **Calculation** | **Value** |
| Active Power Control Set-point Ramp Rate of [insert setting as per signal list %] of Registered Capacity per minute | \_\_\_\_ MW/min  (ESPS to specify calculation and formula used) |
| Capacity Limited Ramp Rate of [insert setting as per signal list %] of Registered Capacity per minute | \_\_\_\_ MW/min  (ESPS to specify calculation and formula used) |
| If battery cores are out of service, will the ESPS ramp at a reduced ramp rate? | \_\_\_\_ MW/min  (ESPS to specify calculation and formula used) |

## Ramp Rate Settings

|  |  |  |
| --- | --- | --- |
| **Mode** | **Rate** | **Priority** |
| Capacity Limited | 1-100% of Registered Capacity per Minute (Note: Setting will be confirmed in unit specific signal list) | 1 |
| Frequency Response | As fast as technically possible. 60% of its expected Active Power response within 5 seconds 100% of its expected Active Power response within 15 seconds. | 2 |
| Active Power Dispatch | 1-100% of Registered Capacity per Minute (Note: Setting will be confirmed in unit specific signal list) | 3 |

## Initial Conditions

If “No” is answered to any of the following, contact NCC and agree next steps in advance of making any corrective actions.

| **Conditions** | **Check on day of test** |
| --- | --- |
| All battery modules are available  (or as outlined in Section 2.1 above) | # modules installed: \_\_\_\_  # modules available: \_\_\_\_ |
| State of charge | \_\_\_\_\_ % |
| Where NCC has control of the reactive power, ensure PPM is exporting close to 0 MVAr at the connection point by bringing kV set-point = system voltage in 1 kV steps | Yes / No |
| MW Profile has been submitted if Test Script is automated | Yes / No / N/A |
| Automated Test Script can be paused. | Yes / No / N/A |
| Test PNs have been submitted  Note this will not be applicable if the unit is not registered in the market | Yes / No / N/A |

# Test Steps

## Demonstration of Limiters

The ability of the ESPS control system to limit the output of the ESPS (and the AAP) to MEC and MIC is demonstrated by sending APC set-points above MEC and below MIC.

|  |  |  |  |
| --- | --- | --- | --- |
| **Step No.** | **Action** | **Time** | **Comments** |
| 1 | ESPS begins data recording for all trends noted in Section 5.3, above |  | Operator Name \_\_\_\_\_\_\_\_\_\_\_\_  Date \_\_\_\_\_\_\_\_\_\_\_\_ |
| 2 | ESPS requests permission from NCC to proceed with the Demonstration of Limiters test and confirms the following with NCC:   1. AAP of the ESPS 2. Frequency Response is OFF 3. APC is ON 4. APC Set point [0MW] 5. MW output of the ESPS 6. ESPS Useable Energy Remaining (MWhr) |  | 1. \_\_\_\_ MW 2. Status \_\_\_\_ 3. Status \_\_\_\_ 4. \_\_\_\_ MW 5. \_\_\_\_ MW 6. \_\_\_\_\_ MWhr |
| 3 | ESPS requests NCC to issue a set-point of [insert Set-point greater than MEC] MW and waits until 1 minute after the set-point has been achieved |  | MW output: \_\_\_\_ MW  AAP: \_\_\_\_ MW |
|  | *(Note: intermediate steps may be added to avoid large MW changes during between Step 3 and 4, particularly if the difference between MEC and MIC is greater than 20MW)* |  |  |
| 4 | ESPS requests NCC to issue a set-point of [insert Set-point less than MIC] MW and waits until 1 minute after the set-point has been achieved |  | MW output: \_\_\_\_ MW  AAP: \_\_\_\_ MW  ESPS Useable Energy Remaining: \_\_\_MWhr |
|  | ESPS informs NCC that the Demonstration of Limiters test is complete. If further testing is not being completed, go to Section 6.6 Return to Standard Settings |  |  |
| Note any issues or deviations from test procedure  For example changes in step size, duration, test operators, parameter changes on site  Mark as “No Comment” if test proceeded as per procedure. | |  | |

## Ramp Rate Settings

Active Power Control Set-point Ramp Rate is adjusted to values between 1% and 100% of Registered Capacity per minute, with ramps carried out at each ramp rate setting.

*Note: Capacity limited ramp rate settings are changed during the Frequency Response Test procedure during the Ramp Rate Priority test. To avoid duplication of testing, we suggest that data from the Ramp Rate test could be used to demonstrate the ESPS ability to change Capacity Limited Ramp Rate setting.*

*A selection of ramp rate settings have been proposed here, as it is not practical to test all values with the requirements. In the test report, please include a statement outlining the ranges that these parameters can be set within.*

| **Step No.** | **Action** | **Time** | **Comments** |
| --- | --- | --- | --- |
| 1 | ESPS begins data recording for all trends noted in Section 5.3, above |  | Operator Name \_\_\_\_\_\_\_\_\_\_\_\_  Date \_\_\_\_\_\_\_\_\_\_\_\_ |
| 2 | ESPS requests permission from NCC to proceed with the Ramp Rate Settings test and confirms the following with NCC:   1. APC is OFF 2. MW output of the ESPS 3. Frequency Response is OFF 4. ESPS Useable Energy Remaining (MWhr) 5. ESPS Total Useable Storage Capacity (MWhr) |  | 1. Status \_\_\_ 2. \_\_\_\_ MW 3. Status \_\_ 4. \_\_ MWhr 5. \_\_ MWhr |
| 4 | ESPS requests NCC to turn APC ON and issue a set-point of [insert 30% of Registered Capacity] MW and waits until 1 minute after the set-point has been achieved |  | MW Output =\_\_\_\_ MW |
| 5 | ESPS sets the Active Power Control Set-point Ramp Rate to 1% of Registered Capacity per minute confirms the following to NCC:   1. Active Power Control Set-point Ramp Rate is now 1% of Registered Capacity per minute |  | \_\_\_\_ MW/min |
| 6 | ESPS requests NCC to issue a set-point of [insert 35% of Registered Capacity] MW and waits until 1 minute after the set-point has been achieved |  | ESPS Useable Energy Remaining: \_\_\_MWhr MW Output =\_\_\_\_ MW |
| 7 | ESPS sets the Active Power Control Set-point Ramp Rate to 100% of Registered Capacity per minute confirms the following to NCC:   1. Active Power Control Set-point Ramp Rate is now 100% of Registered Capacity per minute |  | \_\_\_\_ MW/min |
| 8 | ESPS requests NCC to issue a set-point of [insert 20% of Registered Capacity] MW and waits until 1 minute after the set-point has been achieved |  | AAP =\_\_\_\_ MW  MW Output =\_\_\_\_ MW |
| 9 | ESPS sets the Active Power Control Set-point Ramp Rate to [\_\_]% of Registered Capacity per minute (as per table 5.2 above) confirms the following to NCC:   1. Active Power Control Set-point Ramp Rate is now [\_\_]% of Registered Capacity per minute |  | \_\_\_\_ MW/min  ESPS returns APC ramp rate to setting as per signal list |
| 10 | ESPS requests NCC to issue a set-point of 0MW then turn APC OFF and waits until 1 minute after the MW output has reached 0MW |  | ESPS Useable Energy Remaining: \_\_\_MWhr MW Output =\_\_\_\_ MW |
| 11 | ESPS ends data recording |  |  |
| 12 | ESPS informs NCC that the Ramp Rate Settings test is complete. If further testing is not being completed, go to Section 6.6 Return to Standard Settings |  |  |
| Note any issues or deviations from test procedure  For example changes in step size, duration, test operators, parameter changes on site  Mark as “No Comment” if test proceeded as per procedure. | |  | |

## Active Power Control (APC OFF)

The following test is intended to provide data to demonstrate that the ESPS responds correctly when APC is turned OFF, and that the ESPS does not respond to any set-points sent while Active Power Control is OFF.

*Please also refer to test steps in Frequency Response and Reactive Power Test Procedures where APC set-points are issued. Data from these tests can be used to assess many of the APC pass criteria.*

| **Step No.** | **Action** | **Time** | **Comments** |
| --- | --- | --- | --- |
| 1 | ESPS begins data recording for all trends noted in Section 7.3, above |  | Operator Name \_\_\_\_\_\_\_\_\_\_\_\_  Date \_\_\_\_\_\_\_\_\_\_\_\_ |
| 2 | ESPS requests permission from NCC to proceed with the Active Power Control test and confirms the following with NCC:   1. Frequency Response is OFF 2. APC is OFF 3. AAP export of the ESPS 4. AAP import of the ESPS 5. MW output of the ESPS 6. ESPS Useable Energy Remaining (MWhr) |  | 1. Status \_\_\_\_ 2. Status \_\_\_\_ 3. \_\_\_\_ MW 4. \_\_\_\_ MW 5. \_\_\_\_ MW 6. \_\_\_ MWhr |
| 3 | ESPS requests NCC to turn APC ON and issue a set-point of [insert 50% of Registered Capacity] MW and waits until 3 minutes after the set-point has been achieved |  | AAP =\_\_\_\_ MW  MW Output =\_\_\_\_ MW |
| 4 | ESPS requests NCC to turn APC OFF and waits until 1 minute after the MW output has reached 0MW |  | ESPS shall ramp at Active Power Control Ramp Rate (unless capacity is limited)  MW Output =\_\_\_\_ MW |
| 5 | ESPS requests NCC to issue a set-point of [insert 40% of Registered Capacity] MW |  | ESPS shall not respond to this set-point  MW Output =\_\_\_\_ MW |
| 6 | ESPS requests NCC to turn APC ON and waits until 1 minute after the set-point has been achieved |  | ESPS shall ramp at Active Power Control Set-point Ramp Rate (unless capacity is limited)  MW Output =\_\_\_\_ MW |
| 7 | ESPS requests NCC to issue a set-point of [insert 30% of Registered Capacity] MW and waits until 1 minutes after the set-point has been achieved |  | MW Output =\_\_\_\_ MW |
| 8 | ESPS requests NCC to issue a set-point of 0 MW and waits until 1 minutes after the set-point has been achieved |  | MW Output =\_\_\_\_ MW |
| 9 | ESPS informs NCC that the Active Power Control test is complete. If further testing is not being completed, go to Section 6.6 Return to Standard Settings |  |  |
| Note any issues or deviations from test procedure  For example changes in step size, duration, test operators, parameter changes on site  Mark as “No Comment” if test proceeded as per procedure. | |  | |

## Demonstration of Capacity/Technical Characteristics

Please refer to the Frequency Response ON, Mode 2 test in the Frequency Response Test Procedure. This test includes a step where a frequency injection is held for up to TOR2 timeframe.

If this is not sufficient to demonstrate battery capacity as per registered characteristics, then the following test can be completed.

*Note for Ramping services such as RRD there may also be a requirement to demonstrate EDIL response time. This should be discussed and agreed with Generator Testing if planning to apply for this service*

| **Step No.** | **Action** | **Time** | **Comments** |
| --- | --- | --- | --- |
| 1 | ESPS begins data recording for all trends noted in Section 5.3, above |  | Operator Name \_\_\_\_\_\_\_\_\_\_\_\_  Date \_\_\_\_\_\_\_\_\_\_\_\_ |
| 2 | ESPS requests permission from NCC to proceed with the Active Power Control test and confirms the following with NCC:   1. APC is OFF 2. MW output of ESPS 3. Frequency Response is OFF 4. AAP export of the ESPS 5. AAP import of the ESPS 6. Useable Energy MWHr remaining 7. Duration of battery at full output 8. Capacity Limited Ramp Rate setting applied |  | 1. Status \_\_\_\_  2. \_\_\_ MW  3. Status \_\_\_\_  4. \_\_\_\_ MW  5. \_\_\_\_ MW  6. \_\_\_\_\_MWHr  7. \_\_\_\_\_hours  8. \_\_ % registered capacity per min, \_\_MW/min |
| 3 | ESPS requests NCC to turn APC ON and issue a set-point of [insert 100% of Registered Capacity] MW and wait |  | MW Output =\_\_\_\_ MW  Useable energy remaining: \_\_MWHr |
| 4 | ESPS to remain at full output until Capacity Limited Ramp Rate reduces output to 0MW |  | MW Output =\_\_\_\_ MW  Useable energy remaining: \_\_MWHr |
| 5 | ESPS requests NCC to issue a set-point of 0 MW and turn APC OFF |  | AAP =\_\_\_\_ MW  MW Output =\_\_\_\_ MW |
| 6 | ESPS informs NCC that the Active Power Control test is complete. If further testing is not being completed, go to Section 6.6 Return to Standard Settings |  |  |
| Note any issues or deviations from test procedure  For example changes in step size, duration, test operators, parameter changes on site  Mark as “No Comment” if test proceeded as per procedure. | |  | |

## House Load Measurement/Verification

This test is outlined for the purposes of verifying house load values in connection agreement (if applicable), and verifying the house load value for which the PSO levy will apply. [[3]](#footnote-4)

ESPS to propose appropriate verification of house load, and propose test steps should a test be required.

| **Step No.** | **Action** | **Time** | **Comments** |
| --- | --- | --- | --- |
| 1 | ESPS to specify |  |  |
| 2 | ESPS to specify |  |  |
| 3 | ESPS to specify |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Note any issues or deviations from test procedure  For example changes in step size, duration, test operators, parameter changes on site  Mark as “No Comment” if test proceeded as per procedure. | |  | |

## Return to Standard Settings

The ESPS settings are returned to standard following completion of the Active Power Control Test.

|  |  |  |  |
| --- | --- | --- | --- |
| **Step No.** | **Action** | **Time** | **Comments** |
|  |  |  | Operator Name \_\_\_\_\_\_\_\_\_\_\_\_  Date \_\_\_\_\_\_\_\_\_\_\_\_ |
| 1 | ESPS confirms the following with NCC:   1. ESPS Useable Energy Remaining (MWhr) 2. APC Set-point = 0MW 3. APC is OFF 4. MW output of the ESPS 5. Frequency Response is ON 6. Frequency Response is in Mode 1 (or as agreed with NCC) 7. ESPS frequency reference is system frequency |  | 1. \_\_\_\_ MWhr 2. \_\_\_\_ MW 3. Status \_\_\_\_ 4. \_\_\_\_ MW 5. Status \_\_\_\_ 6. Mode \_\_\_\_ 7. Frequency Reference \_\_\_\_\_\_\_\_\_\_ |
| 2 | ESPS informs NCC that Active Power Control testing is complete |  |  |
| Note any issues or deviations from test procedure  For example changes in step size, duration, test operators, parameter changes on site  Mark as “No Comment” if test proceeded as per procedure | |  | |

## Comments & Signatures

|  |
| --- |
| **Comments:** |
| ESPS Witness signoff that this test has been carried out according to the test procedure, above.  Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| EirGrid Witness signoff that this test has been carried out according to the test procedure, above.  Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

1. <http://www.eirgridgroup.com/library> [↑](#footnote-ref-2)
2. <http://www.eirgridgroup.com/site-files/library/EirGrid/Integration-of-Batteries-Implementation-Note.pdf> [↑](#footnote-ref-3)
3. <https://www.cru.ie/wp-content/uploads/2019/03/CRU19034-Application-of-the-PSO-Levy-to-Commercial-Storage.pdf> [↑](#footnote-ref-4)