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New Response Services
Procurement Rules

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Contents

1. Introduction

1.1 These **Response Procurement Rules** describe the eligibility rules and criteria for participation in **NGESO**'s procurement of **Response Services**, including the daily auction processes pursuant to which **NGESO** procures **Response Services** from prospective **Service Providers** for one or more **Service Periods** in a **Service Day**.

1.2 These **Response Procurement Rules** supplement, and should be read alongside the following documents, which together with these **Response Procurement Rules** constitute the "**Response Procurement Documentation**":-

1.2.1 the **Response Service Terms**;

1.2.2 the **Balancing Services General Terms and Rules of Interpretation**;

1.2.3 the **Common Flexibility Service Terms and Conditions** to the extent that any of its provisions are incorporated by any of the other **Response Procurement Documentation** into such document(s); and

1.2.4 such other document(s) as **NGESO** may designate from time to time as comprising a part of the **Response Procurement Documentation**.

1A. Termination of these Response Procurement Rules

1A.1 These **Response Procurement Rules** shall terminate automatically upon commencement of the **Service Day** which falls immediately prior to the **EAC Go-Live Date**, and all and any **Buy Orders** submitted by **NGESO** under these **Response Procurement Rules** for **Service Windows** in **Service Days** from and after the **EAC Go-Live Date** shall be deemed to be for a zero quantity.

1A.2 Termination of these **Response Procurement Rules** pursuant to paragraph 1A.1 shall be without prejudice to any rights, obligations, claims and liabilities of either **Party** accrued at that date, and the following paragraphs shall survive termination:-

10 (Warranties and Undertakings), 13 (Confidentiality), 17 (Intellectual Property), 18 (Viruses), 21 (Notices), 22 (Dispute Resolution) and 23 (Governing Law and Jurisdiction).

1A.3 In this paragraph 1A, the "**EAC Go-Live Date**" shall have the meaning given to that term in the **Response Service Terms**.

2. Changes to these Response Procurement Rules

2.1 Subject always to paragraph 2.2, **NGESO** may update these **Response Procurement Rules** from time to time by publication of an updated version on its website, and each such updated version shall be effective from the date shown on its front cover.

2.2 To the extent required by the **Electricity Balancing Regulation** (and by reference to those provisions of the **Response Procurement Documentation** which constitute terms and conditions approved by the **Authority** as the terms and conditions related to balancing pursuant to Article 18 of the **Electricity Balancing Regulation**), any variation to these **Response Procurement Rules** will be proposed and implemented in accordance with the applicable requirements in the **Electricity Balancing Regulation**.

3. Defined Terms and Interpretation

3.1 Unless the context otherwise requires, any capitalised term used in these **Response Procurement Rules** shall have the respective meaning given to it (if any) in either

Schedule 1 or the prevailing **Balancing Services Glossary of General Terms and Rules of Interpretation** (as the case may be).

3.2 The rules of interpretation set out in the **Balancing Services Glossary of General Terms and Rules of Interpretation** shall also apply to these **Response Procurement Rules**.

3.3 For the purposes of paragraph 3.1, with respect to any **Sell Order**, "prevailing" shall mean the latest version of the applicable document which is in effect at the time of submission of that **Sell Order**.

4. Registration of Registered Response Participants

4.1 Subject always to paragraph 4.3, no entity may participate in an **Auction** unless and until **NGESO** has confirmed that it is a **Registered Response Participant** in accordance with the **Registration and Pre-Qualification Procedure**.

4.2 Where **NGESO** determines (acting reasonably) that any details provided, including confirmations and declarations given, by a **Registered Response Participant** pursuant to the **Registration and Pre-Qualification Procedure** are no longer true and/or accurate, then **NGESO** may (but shall not be obliged to) de-register the relevant entity as a **Registered Response Participant** and/or **Registered Service Provider** (as the case may be). Such de-registration shall be notified by **NGESO** to the **Registered Response Participant** by email, whereupon no further **Sell Orders** may be submitted by that entity unless and until it is re-registered in accordance with these **Response Procurement Rules** and the **Registration and Pre-Qualification Procedure**.

4.3 An entity which he been confirmed as a **Registered Response Participant** may only submit a **Sell Order** in respect of **Plant** and **Apparatus** where:-

4.3.1 such **Plant** and **Apparatus** has been pre-qualified by **NGESO** to an **Auction Product** as an **Eligible Asset** subject to and in accordance with paragraph 5; and

4.3.2 such **Eligible Asset** has been allocated to a **Response Unit** with a **Registered Quantity** subject to and in accordance with paragraph 6.

5. Prequalification of Eligible Assets

5.1 **Plant** and **Apparatus** may be notified by the **Registered Response Participant** to **NGESO** for pre-qualification as an **Eligible Asset** with a **Registered Quantity** in accordance with the process described in the **Registration and Pre-Qualification Procedure** including the **Testing Rules**.

5.2 The prequalification of **Plant** and **Apparatus** as an **Eligible Asset** shall relate to a specific **Auction Product**, and for the avoidance of doubt **Plant** and **Apparatus** may be prequalified as an **Eligible Asset** in relation to more than one **Auction Product**.

5.3 Where **NGESO** determines (acting reasonably), having regard to declarations of unavailability notified by the **Registered Response Participant** pursuant to the **Response Service Terms** or otherwise, that any **Eligible Asset** is no longer capable of providing its **Registered Quantity** with respect to any relevant **Auction Product**, then **NGESO** shall so notify the **Registered Response Participant** whereupon the **Eligible Asset** shall be ineligible for allocation to any **Response Unit** until such time as it is pre-qualified by **NGESO** once more in accordance with the process described in **Registration and Pre-qualification Procedure** including the **Testing Rules**.

6. Allocation of Eligible Assets to Response Units

6.1 With respect to any **Auction Product**, an **Eligible Asset** may be allocated by the **Registered Response Participant** to a **Response Unit** in accordance with the process described in the **Registration and Pre-qualification Procedure**.

6.2 Notwithstanding allocation of an **Eligible Asset** to a **Response Unit**, **NGESO** may determine (at its sole discretion) that a **Registered Response Participant** may not submit a **Sell Order** with respect to any **Response Unit** if that **Response Unit** is comprised of one or more **Eligible Assets** whose location would mean delivery of the applicable **Auction Product** would compromise operational security.

6.3 It is a further pre-condition to participation in an **Auction** that, in respect of each **Response Unit** and for the duration of each relevant **Service Period** the subject of a **Sell Order**, the **Service Provider** shall have procured that for the purposes of the **ABSVD Methodology Statement** and by exercise (or not) of any opt-out conferred on it (or on the **Lead Party** of all relevant **BM Units**), all and any energy volumes associated with the delivery of Response pursuant to any **Response Contract** will be included within the **Applicable Balancing Services Volume Data** if the **Response Unit** is **BM Participating**, otherwise will not be so included.

7. Buy Orders

7.1 **Buy Orders** for any **Auction Product**, and for any **Service Period**, may be submitted (and updated) by **NGESO** at any time prior to the **Auction Closing Time** (or later as provided in paragraph 7.4).

7.2 **Buy Orders** shall indicate one or more quantities (in MW) for each **Auction Product**, representing **NGESO**'s requirement for that **Auction Product** in the relevant **Service Period** (which for the avoidance of doubt may be zero (0) MW) and an associated **Buy Order Price Limit** for each indicated quantity.

7.3 **Buy Orders** shall not be visible to **Registered Response Participants** on the **Designated Auction Platform** until publication in the **Daily Auction Report** pursuant to paragraph 11.

7.4 A **Buy Order** shall not be capable of being changed by **NGESO** after the **Auction Closing Time**, save in exceptional circumstances where, in **NGESO**'s reasonable opinion and having regard to market activity, there is a need to protect the integrity of the **Auctions**.

8. Sell Orders

8.1 Where a **Registered Response Participant** shall have pre-qualified one or more **Eligible Assets** to an **Auction Product** pursuant to paragraph 5, and allocated any such **Eligible Asset**(s) to a **Response Unit** for that **Auction Product** pursuant to paragraph 6, it may submit one or more **Sell Orders** with respect to that **Response Unit** and **Auction Product**, each for a **Service Period**, in accordance with the following provisions of this paragraph 8.

8.2 **Sell Orders** may be submitted by **Registered Response Participants** at any time after the **Auction Opening Time** and before the **Auction Closing Time**. **Sell Orders** received after the **Auction Closing Time** shall be considered null and void regardless of cause unless otherwise decided by **NGESO** at its sole discretion.

8.3 Each **Sell Order** shall relate to a single **Response Unit** and **Auction Product**. To be valid, each **Sell Order** will need to be fully completed and correct as at the relevant **Auction Closing Time**, and must include (in the correct format as specified from time to time by the **Auction Administrator**):-

8.3.1 the name of the **Registered Response Participant**;

8.3.2 the unique "order ID" allocated to the **Sell Order** by the **Auction Administrator**;

8.3.3 the **Response Unit** (by reference to its "portfolio name" allocated to it as either **BMU ID** or **Non-BM Unit ID**);

8.3.4 the applicable **Auction Product**;

8.3.5 the applicable **Service Period** or consecutive **Service Periods** in the same **Service Day** over which it is defined;

8.3.6 a "block code" indicating whether the **Sell Order** is a **Parent Block** (C01) or a **Child Block** (C02) or a **Loop Block** (C88);

8.3.7 a price (in £/MW/h, where the applicable pound and pence figures shall each be an integer) which, where it is defined over consecutive **Service Periods**, shall be a single price for each such **Service Period**;

8.3.8 the **Offered Quantity** (in MW) for each applicable **Service Period**;

8.3.9 if a **Child Block**, the "order ID" of an associated **Parent Block**, which must relate to the same **Auction Product** and **Response Unit**;

8.3.10 if a **Loop Block**, one other associated **Loop Block**, which must relate to the same **Response Unit** and a different **Auction Product**; and

8.3.11 if a **Loop Block**, its **Minimum Acceptance Ratio**.

8.4 All **Sell Orders** which are **Child Blocks**:

8.4.1 have a **Minimum Acceptance Ratio** equal to zero (0); and

8.4.2 must be defined over a single **Service Period** comprising:-

(a) any of the **Service Period**(s) over which its **Parent Block** is defined; or

(b) the **Service Period** immediately preceding the **Service Period** (or the first **Service Period**) over which its **Parent Block** is defined (if within the same **EFA Day**); or

(c) the **Service Period** immediately succeeding the **Service Period** (or the last **Service Period**) over which its **Parent** is defined (if within the same **EFA Day**).

8.5 In relation to any **Response Unit**, **Service Period**, and **Auction Product**:-

8.5.1 a **Registered Response Participant** may submit a maximum of one (1) **Sell Order** which is a **Parent Block** (with "block code" C01), and a maximum of one (1) **Sell Order** which is a **Child Block** (with "block code" C02), and a maximum of one (1) **Sell Order** which is a **Loop Block** (with "block code" C88);

8.5.2 the sum of the **Offered Quantities** of all submitted **Sell Orders** shall not exceed the **Registered Quantity**; and

8.5.3 a Sell **Order** may not be submitted for that **Service Period** where that **Service Period** is the subject of a **Sell Order** in relation to that **Response Unit** for

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another **Response Service** (but for the avoidance of doubt may be submitted for the other **Auction Product** variant of the same **Response Service**).

8.6 Where, in relation to any **Response Unit**, any **Sell Order** is submitted for a **Service Period** and **Auction Product** which is the subject of a valid **Sell Order** previously submitted for that **Response Unit**, then the earlier **Sell Order** shall be treated as cancelled.

8.7 Validation of **Sell Orders** will be undertaken automatically at the time of submission (before operation of the **Auction** algorithm), and without prejudice to paragraph 8.13 all submitted **Sell Orders** so validated remain valid unless and until:-

8.7.1 the **Sell Order** is cancelled by the **Registered Response Participant** that submitted it (including in the manner described in paragraph 8.6);

8.7.2 the **Registered Response Participant** modifies it (and, in such case, paragraph 8.6 shall apply); or

8.7.3 the **Sell Order** is either accepted (including part accepted) or rejected in accordance with the **Market Clearing Rules** (whereupon it expires).

8.8 Each **Registered Response Participant** is responsible for ensuring that the **Sell Orders** it submits are correct and valid.

8.9 Subject always to paragraph 8.10, upon becoming aware of any error in a **Sell Order**, the **Registered Response Participant** shall modify the **Sell Order** where possible otherwise shall notify **NGESO** immediately, provided that in such event there shall be no obligation on **NGESO** to take any steps to avoid or mitigate any potential losses to the **Registered Response Participant**.

8.10 After the **Auction Closing Time**, **Sell Orders** may not be modified or cancelled by the **Registered Response Participant** and are binding and irrevocable subject always to paragraph 8.7

8.11 **Sell Orders** submitted by **Registered Response Participants** for each **Service Period** and **Auction Product** shall not be visible to other **Registered Response Participants** on the **Designated Auction Platform** until publication in the **Daily Auction Report** in the manner described in paragraph 11.

8.12 If, in the sole judgment of **NGESO** or the **Auction Administrator**, a **Registered Response Participant** has failed to submit a correct and valid **Sell Order** in accordance with this paragraph 8, **NGESO** or the **Auction Administrator** reserves the right to:-

8.12.1 deem that **Sell Order** to be valid and correct; or

8.12.2 cancel that **Sell Order**; and/or

8.12.3 take any other action as it deems appropriate in the circumstances including requesting the **Registered Response Participant** to resubmit and/or amend the **Sell Order** so that it is correct and valid.

8.13 The decision of **NGESO** or the **Auction Administrator** as to whether or not a **Sell Order** is correct and valid shall be final, and the **Registered Response Participant** may be notified of such decision without prior consultation or explanation.

9. Market Clearing Rules

9.1 After the **Auction Closing Time**, the **Auction** algorithm will optimise the matching of all valid **Sell Orders** to the **Buy Orders** through the ***acceptance*** (or ***partial acceptance***)

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of **Sell Orders. Sell Orders** will be ***accepted*** to maximise ***total auction surplus***, subject always to the other provisions of this paragraph 9.

9.2 For each **Service Period** and **Auction Product**, the **Auction** algorithm will determine a **Market Clearing Price**, all as more particularly described or referred to in this paragraph 9.

9.3 The **Auction** algorithm will ***accept*** (or ***partially accept***) **Sell Orders** in accordance with the following rules:-

9.3.1 a **Parent Block** (C01) may be ***accepted*** or be ***rejected***;

9.3.2 each ***accepted*** **Parent Block** (C01) must belong to a ***linked family*** that has non-negative ***order surplus***;

9.3.3 a **Child Block** (C02) may be ***accepted***, or ***partially accepted***, or ***rejected***;

9.3.4 a **Child Block** (C02) may be ***accepted*** or ***partially accepted*** only if its associated **Parent Block** (C01) is ***accepted***;

9.3.5 each accepted **Child Block** (C02) must have non-negative ***order surplus***;

9.3.6 an ***accepted*** **Child Block** (C02) may be ***partially accepted*** only if it has ***order surplus*** equal to zero (0);

9.3.7 a **Loop Block** (C88) may be ***accepted***, or ***partially accepted***, or ***rejected***;

9.3.8 a **Loop Block** (C88) may be ***accepted*** or ***partially accepted*** only if the other **Loop Block** (C88) with which it is associated is ***accepted*** or ***partially accepted***;

9.3.9 each ***accepted*** **Loop Block** (C88) must belong to a ***looped family*** that has non-negative ***order surplus***;

9.3.10 each **Buy Order** must have non-negative ***order surplus***;

9.3.11 for the avoidance of **doubt**, a **Sell Order** with positive ***order surplus*** can be rejected ("***paradoxically rejected***"); and

9.3.12 for the purposes of this paragraph 9.3, in relation to any **Sell Order**:-

(a) ***accepted*** means the **Sell Order** shall form a **Response Contract** for that **Response Unit** and **Auction Product** and for each **Service Period** on which the **Sell Order** is defined, and the **Contracted Quantity** for each **Response Contract** so formed shall be equal to the **Offered Quantity** of the corresponding **Service Period** of the **Sell Order**;

(b) ***partially accepted*** means the **Sell Order** shall form a **Response Contract** for that **Response Unit** and **Auction Product** and for each **Service Period** on which the **Sell Order** is defined, and the **Contracted Quantity** for each **Response Contract** so formed shall be an integer less than the **Offered Quantity** of the corresponding **Service Period** of the **Sell Order** and greater than or equal to the **Minimum Acceptance Ratio** times the **Offered Quantity** of the corresponding **Service Period** of the **Sell Order**;

(c) ***rejected*** means the **Sell Order** does not form a **Response Contract**;

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(d) ***linked family*** means a **Parent Block** and all **Child Blocks** with which it is associated;

(e) ***looped family*** means two (2) **Loop Blocks** associated with each other;

(f) ***order surplus*** with respect to a **Sell Order** means the sum, for all **Service Periods** on which the **Sell Order** is defined, of the **Contracted Quantity** times the difference between the **Market Clearing Price** for that **Service Period** less the price limit of that **Sell Order**; and ***order surplus*** with respect to a ***linked family*** means the sum of the ***order surplus*** of all **Sell Orders** which comprise the ***linked family***; and ***order surplus*** with respect to a ***looped family*** means the sum of the ***order surplus*** of ***Sell Orders*** which comprise the ***looped family***; and ***order surplus*** with respect to a **Buy Order** means the sum of the **Contracted Quantities** for all **Response Contracts** for the **Service Period** on which the **Buy Order** is defined, times the difference between the **Buy Order Price** limit corresponding this sum of **Contracted Quantities**, less the **Market Clearing Price** for that **Service Period;**

(g) ***total auction surplus*** means the sum of the ***order surplus*** of all **Buy Orders** plus the sum of the ***order surplus*** of all ***accepted*** or ***partially accepted*** **Sell Orders**, in each case in respect of the **Auction Product** in question; and

(h) ***paradoxically rejected*** means that a **Sell Order** is rejected even if its price limit is less than the **Market Clearing Price.**

9.4 Each **Sell Order** for a **Service Period** accepted (or part accepted) in accordance with the market clearing process described in this paragraph 9 in relation to an **Auction Product** shall form a **Response Contract** for that **Response Unit**, **Service Period** and **Auction Product** as more particularly provided in paragraph 12.

10. Warranties and Undertakings

10.1 Without prejudice to its other obligations under and/or pursuant to the **Response Procurement Documentation** and any **Response Contract** and subject to paragraphs 12.1 and 12.3 of the prevailing **Common Flexibility Service Terms and Conditions** which shall apply as if set out in full herein:-

10.1.1 **NGESO** and each **Registered Response Participant** warrants and undertakes to the other in the manner set out in paragraph 6.1 of the prevailing **Common Flexibility Service Terms and Conditions** as if set out in full herein; and

10.1.2 on each occasion it submits a **Sell Order**, the **Registered Response Participant** warrants and undertakes to **NGESO** in the manner set out in paragraph 6.26.2 of the prevailing **Common Flexibility Service Terms and Conditions** as if set out in full herein.

10.2 Without prejudice to any other right or remedy, **NGESO** and the **Registered Response Participant** shall each be entitled to claim damages from the other for any breach of the warranties and undertakings or any of them set out or referred to in this paragraph 10 subject to paragraphs 12.1 and 12.3 of the prevailing **Common Flexibility Service Terms and Conditions** which shall apply as if set out in full herein.

10.3 Each **Registered Response Participant** indemnifies **NGESO** from and against any losses, liabilities, claims, expenses and demands which **NGESO** might suffer as a result

of the **Registered Response Participant** being in breach of the warranties and undertakings or any of them set out or referred to in paragraph 10.1.2.

11. Daily Auction Reports

11.1 By such time following the **Auction Results Time** as may be specified by **NGESO** from time to time, **NGESO** shall publish (and may subsequently revise) the **Daily Auction Report**.

11.2 Each **Daily Auction Report** may (at **NGESO**'s sole discretion) include in relation to each **Auction Product** and **Service Period**:-

11.2.1 for each **Sell Order**, the information contained in paragraph 8.3 together with the location of each relevant **Eligible Asset** (whether or not the subject of an accepted **Sell Order**);

11.2.2 the **Buy Order** requirement;

11.2.3 the **Market Clearing Price**;

11.2.4 the **Auction Clearing Quantity**; and

11.2.5 in relation to each accepted **Sell Order**, the quantity of the **Auction Product** the subject of a **Response Contract**.

12. Formation of Response Contracts

12.1 The **Auction Administrator** shall publish the outcome of each **Auction** by no later than the **Auction Results Time** and such information shall also be published by **NGESO** at such time and in such format as it shall determine in its sole discretion. Insofar as **NGESO**'s publication confirms the acceptance (or partial acceptance where applicable) of a **Sell Order**, a **Response Contract** will be formed automatically and simultaneously with such publication and for the purposes of paragraph 12.2 shall be treated as awarded to the relevant **Registered Response Participant**.

12.2 Each **Registered Response Participant** awarded a **Response Contract** pursuant to paragraph 12.1 shall provide the relevant **Auction Product** from the applicable **Response Unit** during the applicable **Service Period** pursuant to and in accordance with the **Response Service Terms**.

12.3 For the avoidance of doubt, for any **Registered Response Participant** with a **Response Unit** the subject of one or more accepted (or part accepted) **Sell Orders** in a **Service Day**, there shall be a separate **Response Contract** formed in respect of that **Response Unit** for each **Service Period** and **Auction Product**.

12.4 Each **Response Contract** shall be personal to **NGESO** and the **Registered Response Participant** and neither Party shall assign, transfer, mortgage, charge, sub-contract or deal in any other manner with any or all of its rights and obligations under a **Response Contract** except as permitted by the **Response Service Terms** or in accordance with paragraph 21 of the prevailing **Common Flexibility Service Terms and Conditions** as if such provision was set out in full herein.

13. Confidentiality

13.1 Subject always to paragraphs 13.2 and 13.3, the provisions of paragraph 13 of the prevailing **Common Flexibility Service Terms and Conditions** shall apply to all and any information provided by **NGESO** or any **Registered Response Participant** to the other (whether orally or in writing) pursuant to or in connection with these **Response Procurement Rules** as if set out in full herein.

13.2 Each **Registered Response Participant** agrees to the publication by **NGESO** of the information contained in the **Daily Auction Reports**, including in a non-anonymised form, insofar as relating directly or indirectly to the **Registered Response Participant** and the relevant **Response Unit**.

13.3 Without limiting paragraph 13.2, each **Registered Response Participant** also agrees to the disclosure by **NGESO** to the relevant **Public Distribution System Operator** of information related to any **Sell Order** (whether or not accepted) insofar as relevant to the management and operation of its **Distribution System**, including without limitation location of each **Eligible Asset** allocated to the relevant **Response Unit** and its MPAN and technology type, **Auction Product** and the **Contracted Quantity**.

14. Exceptional Circumstances

14.1 If an exceptional situation arises, in particular if a system or the information needed to operate an **Auction** is unavailable or if an incident prevents an **Auction** from being held in normal circumstances, then **NGESO** may take any or all of the following measures (at its sole discretion):-

14.1.1 modify any or all of the **Auction Opening Time**, **Auction Closing Time** or **Auction Results Time**;

14.1.2 authorise **Registered Response Participants** to submit new **Sell Orders** or modify existing **Sell Orders**;

14.1.3 authorise **Registered Response Participants** to submit **Sell Orders** otherwise than in accordance with paragraph 8;

14.1.4 cancel the **Auction** for any one or more **Service Days**; and/or

14.1.5 take such other actions or steps as it reasonably considers to be necessary.

15. Use of Designated Auction Platform

15.1 Insofar as made available as part of the **Auctions**, each **Registered Response Participant** agrees to use the **Designated Auction Platform** (including all and any associated hardware and software IT and telecommunications equipment and transmission media):-

15.1.1 in compliance with all applicable **Law**;

15.1.2 in compliance with all and any technical specifications provided from time to time by or on behalf of **NGESO** or the **Auction Administrator**; and

15.1.3 solely for the purpose of formation of **Response Contracts** (and any other contracts for **Balancing Services** from time to time procured by **NGESO** on the **Designated Auction Platform**),

and any other use is strictly prohibited.

16. Accuracy of Information

16.1 All and any information provided by **NGESO** to **Registered Response Participants** for the purposes of these **Response Procurement Rules** including in each **Daily Auction Report** is provided in good faith, but no representation or warranty is given by **NGESO** (or any of its employees, officers, agents or advisers) as to the accuracy or completeness of such information.

17. Intellectual Property

17.1 **NGESO** and each **Registered Response Participant** retain ownership of the documents, data and information of any kind (including all intellectual property rights in them) that are provided to the other pursuant to these **Response Procurement Rules**.

17.2 Each **Registered Response Participant** undertakes to **NGESO** that it will at all times when participating in an **Auction**, hold all and any authorisations and/or property rights and/or licences for all of the configurations, interfaces, firmware and software needed by it for it to participate in the applicable **Auction** through the **Designated Auction Platform**.

17.3 Each **Registered Response Participant** shall comply (and use reasonable endeavours to ensure that its staff and other representatives comply) with all applicable user licences and terms of use of which the **Registered Response Participant** is aware governing use by the **Registered Response Participant** of the systems or software applications comprised in the **Designated Auction Platform**.

17.4 Each **Registered Response Participant** indemnifies and keeps indemnified **NGESO** from and against any claims from a third party relating to an infringement of that third party's intellectual property rights or other property rights arising out of use by the **Registered Response Participant** of the **Designated Auction Platform** in breach of any user licence or terms of use referred to in paragraph 17.1 of which it is aware.

17.5 **NGESO** shall procure such third-party intellectual property authorisations as may be necessary to enable the **Registered Response Participant** to use the **Designated Auction Platform** for the purposes of each **Auction**.

17.6 **NGESO** shall indemnify and keep indemnified the **Registered Response Participant** from and against any claims from a third party if and to the extent that the use of the **Designated Auction Platform** by such **Registered Response Participant** for the purposes of a **Sell Order** infringes a third party's intellectual property rights or other property rights.

17.7 In respect of the indemnities given in paragraphs 17.4 and 17.6 the indemnified party shall:-

17.7.1 notify the indemnifying party as soon as possible of any claim the subject of the indemnity (in this paragraph 17, **"IPR Claim**");

17.7.2 give the indemnifying party control of the **IPR Claim**;

17.7.3 make no admissions in respect of an **IPR Claim** without prior written consent of the indemnifying party; and

17.7.4 provide such support in respect of the **IPR Claim** as the indemnifying party may reasonably require at the cost of the indemnifying party.

18. Viruses

18.1 Each **Registered Response Participant** shall, prior to uploading any information to the **Designated Auction Platform** or otherwise interfacing with it, use up to date versions of anti-virus software available from an industry accepted anti-virus software vendor to check for and delete from its systems viruses, trojan horses, worms, time-bombs, keystroke loggers, spyware, adware or any other harmful programmes or similar computer code designed adversely to affect the operation of any computer software or hardware (in this paragraph 18.1, "**Malicious Software**").

18.2 If, notwithstanding the provisions of paragraph 18.1, **Malicious Software** is found on the **Designated Auction Platform**, the **Registered Response Participant** shall provide reasonable co-operation to **NGESO** to assist in reducing the effect of the **Malicious Software** and, particularly if **Malicious Software** causes loss of operational efficiency to the **Designated Auction Platform**, provide reasonable assistance to assist **NGESO** to mitigate any losses and restore the **Designated Auction Platform** to its original operating efficiency.

19. Costs

19.1 For the avoidance of doubt, each **Registered Response Participant** shall remain responsible for all costs and expenses incurred by it in connection with these **Response Procurement Rules** including all costs of registration, pre-qualification and allocation of assets, and preparing and submitting **Sell Orders**.

20. Site Export and Import Limits

20.1 Each **Registered Response Participant** shall, prior to submitting a **Sell Order**, ensure sufficient export and/or import capacity at the premises at which each relevant **Eligible Asset** is situated (including where applicable **Transmission Entry Capacity** (and, if relevant, the **STTEC**)) so as to enable it to provide the relevant **Auction Product** during each and every applicable **Service Period** in accordance with its obligations under the **Response Contract** which may be formed in relation thereto and in conformance with its obligations owed to the owner of the relevant part of the **National Electricity Transmission System** or the relevant **Distribution System** or such other network (as applicable).

21. Notices

21.1 Save to the extent the manner of communication between **NGESO** and **Registered Response Participants** is stipulated in the **Registration and Pre-Qualification Procedure**, paragraph 17 of the prevailing **Common Flexibility Service Terms and Conditions** shall apply as if set out in full herein to any notice required to be submitted under these **Response Procurement Rules** by either **NGESO** or the **Registered Response Participant** to the other.

21.2 For the purposes of paragraph 21.1, the relevant contact details and addresses of each Party shall be those notified from time to time by that Party to the other pursuant to the **Registration and Pre-Qualification Procedure**.

22. Dispute Resolution

22.1 The provisions of paragraph 18 of the prevailing **Common Flexibility Service Terms and Conditions** shall apply in relation to any dispute or difference of whatever nature however arising under, out of, or in connection with these **Response Procurement Rules** as if set out in full herein, save that:-

22.1.1 no **Party** shall have any right to refer any dispute to an **Expert** for determination except where the dispute is stated in these **Response Procurement Rules** to be referable to an **Expert** for determination or otherwise agreed in writing by the **Parties** to be so referable;

22.1.2 nothing in this paragraph 22 shall prevent the **Parties** from agreeing to resolve any dispute or difference through the courts in which case paragraph 23.1 shall apply; and

22.1.3 where any dispute is referred to arbitration, the Electricity Arbitration Association arbitration rules shall apply unless otherwise agreed in writing by

the **Parties** (and paragraph 17.1 of the prevailing **Common Flexibility Service Terms and Conditions** shall be read and construed accordingly).

23. Governing Law and Jurisdiction

23.1 Any claim, dispute or matter (whether contractual or non-contractual) arising under or in connection with these **Response Procurement Rules** or their enforceability shall be governed by and construed in accordance with the laws of England and Wales.

23.2 Subject always to paragraph 22, **NGESO** and each **Registered Response Participant** submits to the exclusive jurisdiction of the courts of England and Wales over any claim, dispute or matter arising under or in connection with these **Response Procurement Rules** or their enforceability and waives any objection to proceedings being brought in such courts or on the grounds that proceedings have been brought in an inconvenient forum.

Schedule 1 – Defined Terms

"Auction"	each separate auction for each **Service Period** and **Auction Product** run in a **Service Day**;
"Auction Administrator"	the operator from time to time of the **Designated Auction Platform**;
"Auction Clearing Quantity"	in relation to an **Auction Product** and for each **Service Period** falling in any **Service Day**, the sum of the quantities (MW) of all executed **Sell Orders** (being the aggregate **Contracted Quantity** for all such **Sell Orders** as reduced by any part accepted **Sell Orders**);
"Auction Closing Time"	in respect of the **Service Periods** falling in any **Service Day**, 14.30 hours on the **EFA Day** which immediately precedes that **Service Day**;
"Auction Opening Time"	in respect of the **Service Periods** falling in any **Service Day**, 08.00 hours on the fourteenth **EFA Day** which immediately precedes that **Service Day**;
"Auction Product"	the low or high frequency variant of each **Response Service**, and **"Auction Products"** shall be construed accordingly;
"Auction Results Time"	in respect of the **Service Periods** falling in any **Service Day**, 15.00 hours on the **EFA Day** which immediately precedes that **Service Day**;
"Base Rate"	in respect of any **Day**, the rate per annum which is equal to the base lending rate from time to time of Barclays Bank plc as at the close of business on the immediately preceding **Business Day**;
"BM Participating"	in respect of any **Response Unit**, means that for the duration of a **Service Day** it is or will be registered as a **BM Unit**;
"Buy Order"	an **Order** submitted by **NGESO** in accordance with paragraph 7 of these **Response Procurement Rules** comprising its requirement for the procurement of an **Auction Product** in each **Service Period** during **Service Days**, validly registered as such on the **Designated Auction Platform**, with each having an associated **Buy Order Price Limit**;
"Buy Order Price Limit"	in respect of any **Buy Order**, the maximum **Market Clearing Price**(s) as determined by **NGESO** at its sole discretion;
"Child Block"	in respect of any **Response Unit** and **Auction Product**, a **Sell Order** whose acceptance is dependent on the acceptance of another **Sell Order** for that same **Auction Product** relating to the same **Service Period** (being its **Parent Block**);

"Contracted Service Period"	a **Service Period** the subject of a **Response Contract**;
"Contracted Quantity"	in respect of any **Response Unit** and **Service Period**, the amount of **Response** (MW) which a **Service Provider** has agreed to provide as an **Auction Product** in accordance with a **Response Contract**;
"Curtailable"	the capability of a **Sell Order** to be partially accepted;
"Daily Auction Report"	the report (which may comprise more than one document, published separately) published by **NGESO** pursuant to these **Response Procurement Rules**;
"Data Concentrator"	a software platform utilised by **NGESO** for the receipt of **Operational Data**;
"Day"	a calendar day;
"Delivery Duration"	in relation to any **Response Unit** and **Service Period**, the time over which the **Contracted Quantity** must be capable of being delivered so as to derive the **Response Energy Volume**, being sixty (60) minutes;
"Designated Auction Platform"	the auction platform(s) from time to time designated by **NGESO** for use in connection with the **Auctions**;
"DRSC Liable User"	any **Service Provider** whose **Response Contract** renders it a **Demand Response Provider** by virtue of the relevant **Response Unit** comprising a source of controllable **Demand**;
"Dynamic Moderation", or "DM"	a fast-acting pre-fault (low or high **Frequency**) **Balancing Service** designed to contain **System Frequency** in the event of a sudden change in demand or generation, delivered primarily when **System Frequency** is within operational limits (50 Hz +/- 0.2%)%), and DM-high (DM-H) and DM-low (DM-L) shall be construed accordingly;
"Dynamic Containment", or "DC"	a fast-acting post-fault (low or high **Frequency**) **Balancing Service** designed to contain **System Frequency** in the event of a sudden demand or generation loss, delivered primarily when **System Frequency** falls outside of operational limits (50 Hz +/- 0.2%), and DC-high (DC-H) and DC-low (DC-L) shall be construed accordingly;

"Dynamic Regulation", or "DR"	a slow-acting pre-fault (low or high **Frequency**) **Balancing Service** designed to contain **System Frequency** in the event of a change in demand or generation, delivered primarily when **System Frequency** is within operational limits (50 Hz +/- 0.2%) %), and DR-high (DR-H) and DR-low (DR-L) shall be construed accordingly;
"Electricity Balancing Regulation"	the English version of Commission Regulation (EU) 2017/2195 of 23 November 2017 as converted into **Retained EU Law**;
"Eligible Asset"	one or more items of **Plant** and **Apparatus** located at the same group **Grid Supply Point** (or at **NGESO's** sole discretion, **Grid Supply Point**) which have been validated by **NGESO** pursuant to these **Response Procurement Rules** as capable (either individually or in combination with one or more other **Eligible Assets**) of providing an **Auction Product**;
"Energy Limited"	a classification given in the **Response Procurement Documentation** to any **Response Unit** comprised of one or more **Eligible Assets**:- (a) which creates its store of energy by using power ultimately drawn from the **National Electricity Transmission System**; and (b) whose **State of Energy** at the start of a relevant **Service Period** is insufficient to provide full delivery of the **Contracted Quantity** for the duration of that **Service Period**;
"Energy Recovery"	in relation to any **Response Unit** which is **Energy Limited** and to any **Service Period**, the minimum volume of **Active Energy** (MWh) capable of being recovered by way of **State of Energy** management in a single **Settlement Period**, calculated as twenty percent (20%) of **Response Energy Volume**;
"Frequency"	the number of alternating current cycles per second (expressed in Hertz) at which a **System** is running;
"Frequency Deviation"	as defined in the **CUSC**;
"Frequency Measurement Standard"	the prevailing document titled "Frequency Measurement Standard" published by or on behalf of **NGESO** from time to time;
"Grid Supply Point"	as defined in the **Grid Code**;
"Independent Technical Expert"	as defined in Schedule 3 of these **Response Procurement Rules**;
"Input Frequency"	the number of alternative current cycles per second (expressed in Hertz) as measured at the grid connection point of the relevant **Eligible Asset**;

"IPR Claim"	as defined in paragraph 17 of these **Response Procurement Rules**;
"Loop Block"	in respect of any **Response Unit** and **Auction Product**, a **Sell Order** defined over one or more **Service Periods** in a **Service Day** which stipulates that its acceptance is a pre-condition to acceptance of one other **Loop Block** for another **Auction Product**, each of such **Loop Blocks** relating to the same or different **Service Period**(s) in the same **Service Day**;
"Malicious Software"	as defined in paragraph 18 of these **Response Procurement Rules**;
"Market Clearing Price"	for each **Service Period** and **Auction Product**, the price (£/MW/h) of the highest executed **Sell Order** (so that, in each **Service Day** and for any **Auction Product**, there shall be six (6) **Market Clearing Prices** each attributable to a single **Service Period**);
"Market Clearing Rules"	the rules set out or referred to in paragraph 9 of these **Response Procurement Rules**;
"Maximum Ramp Rate"	in relation to any **Response Unit** which is **Energy Limited** and to any **Service Period**, the maximum ramp rate permitted at any point within an **Operational Baseline** and **Performance Baseline**, calculated as five percent (5%) of **Contracted Quantity**, as more particularly referred to in the **Response Service Terms**;
"Metering Equipment"	as defined in the **BSC**;
"Minimum Acceptance Ratio"	for each **Loop Block**, the extent to which it is **Curtailable** being a range from zero (fully **Curtailable**) to one (not **Curtailable**);
"Non-BM Data Submission"	a notification from a **Service Provider** to **NGESO** giving prevailing operational and other information with respect to a **Response Unit** as more particularly described in the **Response Service Terms**;
"Offered Quantity"	a quantity of **Auction Product** associated with a **Response Unit**, which shall be an integer not less than one (1) MW and shall not exceed any maximum limit which may be specified from time to time by **NGESO**, and which shall not in any event exceed the aggregate **Registered Quantity** of each component **Eligible Asset**;
"Operational Baseline"	the **Service Provider**'s best estimate of **Active Power Output** or **Demand** from or attributable to a **Response Unit** in any **Settlement Period**, as notified to **NGESO** in accordance with the **Response Service Terms**;

"Parent Block"	in respect of any **Response Unit** and **Auction Product**, a **Sell Order** which stipulates that its acceptance is a pre-condition to acceptance of one or more other **Sell Orders** for that same **Auction Product** (each being its **Child Blocks**);
"Performance Baseline"	in relation to any **Response Unit**, the intended operating profile where applicable prior to the delivery of the applicable **Auction Product** (being a level (which may be zero) of **Output** or **Demand** and which, where applicable, shall be an aggregate operating profile across all **Eligible Assets**);
"Proceedings"	as defined in paragraph 12 (*Governing law and jurisdiction*) of the **Balancing Services General Terms and Conditions**;
"Registered Quantity"	in relation to any **Eligible Asset**, the maximum amount of **Response** capable of being delivered as an **Auction Product** as validated by **NGESO**;
"Registered Response Participant"	a **Registered Service Provider** who has registered with **NGESO** pursuant to the **Registration and Pre-Qualification Procedure** as eligible to participate in the procurement of an **Auction Product**, which shall include acceding to the **Response Procurement Documentation**;
"Registered Service Provider"	an entity who has submitted the relevant registration documents and to whom **NGESO** has confirmed is subsequently registered as such in each case pursuant to the **Registration and Pre-Qualification Procedure**;
"Registration and Pre-Qualification Procedure"	the procedure and processes described in Schedule 2 of these **Response Procurement Rules**;
"Response Contract"	a **Balancing Services Contract** for the delivery of an **Auction Product** from a **Response Unit** in a **Service Period** as more particularly described in the **Response Service Terms**;
"Response Energy Volume"	in relation to any **Response Unit** and **Service Period**, the volume of stored **Active Energy** (MWh) (or capability to store energy) that a **Response Unit** should be capable of delivering before becoming unavailable due to exhaustion (calculated as the **Contracted Quantity** multiplied by the **Delivery Duration**);
"Response Procurement Documentation"	as described in paragraph 1.2 of these **Response Procurement Rules**;
"Response Procurement Rules"	this document as published by or on behalf of **NGESO** from time to time;

"Response Service(s)"	**Dynamic Containment**, **Dynamic Regulation** and **Dynamic Moderation** and any other **Balancing Service** designed for the management of **System Frequency** that **NGESO** may specify from time to time that it wishes to procure through the **Auctions**, each of which may have a low frequency (LF) or high frequency (HF) variant;
"Response Service Terms"	the prevailing document titled "**New Response Services Service Terms**" published by or on behalf of **NGESO** from time to time containing the terms and conditions governing **Response Contracts**;
"Response Unit"	a collection of one or more **Eligible Assets** registered as such by a **Registered Response Participant** at the relevant time in accordance with the **Registration and Pre-Qualification Procedure**;
"Retained EU Law"	as defined by section 6(7) of the European Union (Withdrawal) Act 2018 as amended by the European Union (Withdrawal Agreement Act) 2020;
"Sell Order"	in respect of a **Response Unit**, an **Order** submitted by a **Registered Response Participant** in accordance with these **Response Procurement Rules** for the delivery upon and subject to the **Response Service Terms** of an **Auction Product** during a **Service Period** falling in a **Service Day**, validly registered as such on the **Designated Auction Platform**;
"Service Day"	an **EFA Day** comprising one or more **Service Periods** in respect of which **NGESO** has issued a **Buy Order**;
"Service Period"	the prevailing period notified by **NGESO** to **Registered Response Participants** being either a single **Settlement Period** or series of consecutive **Settlement Periods** in a **Service Day** over which **Buy Orders** and **Sell Orders** are defined, and for the avoidance of doubt any changes to **Service Periods** notified by **NGESO** shall not be effective earlier than the **EFA Day** the subject of the next following **Buy Order** after such notification;
"Service Provider"	with respect to any **Response Contract**, the applicable **Registered Response Participant**;
"Single Market Platform"	the online platform hosted by **NGESO** comprising (inter alia) the **Registration and Pre-Qualification Procedure** and which facilitates the pre-qualification of **Eligible Assets** and their allocation and reallocation to **Response Units**;

"Stacking Guidance"	the prevailing document titled "Unlocking Stacking of BOAs with Frequency Response Services" published by or on behalf of **NGESO** from time to time setting out the rules for simultaneous provision from the same **Response Unit** of **Response Services** and offers and bids in the **Balancing Mechanism**;
"State of Energy"	the prevailing state of charge of a battery representing its available **Active Power Output** and **Demand**;
"System Frequency"	the **Frequency** of the **System**;
"Target Frequency"	as defined in the **CUSC**;
"Testing Rules"	the rules for testing **Eligible Assets** forming part of the **Registration and Pre-Qualification Procedure** as described in Schedule 3.

Schedule 2 - Registration and Pre-Qualification Procedure

Summary

For an entity to register as a **Registered Response Participant**, it must first become a **Registered Service Provider** by submitting its corporate details onto **NGESO** systems and (if accepted) receiving a user ID. To become a **Registered Response Participant** it must then accede to the **Response Procurement Documentation**. Once registration is complete, a **Registered Response Participant** may then submit assets under its operation or control for prequalification by **NGESO** as **Eligible Assets**.

Prequalification as an **Eligible Asset** will relate to a specific **Auction Product**. Accordingly, pre-qualification may involve asset testing and validation. An asset may be pre-qualified as an **Eligible Asset** to more than one **Auction Product** including to both **Auction Product** variants of the same **Response Service**.

Once pre-qualified, an **Eligible Asset** may be allocated by the **Registered Response Participant** to a **Response Unit** created for a specific **Auction Product**, and for the avoidance of doubt an **Eligible Asset** may only be allocated to a **Response Unit** for the relevant **Auction Product**. Once a **Response Unit** has at least one **Eligible Asset** allocated to it, it may participate in the daily auctions for the applicable **Auction Product**.

Process and Timings

Outlined below is the process and associated timings for registration and asset pre-qualification. Further detail will be provided from time to time by **NGESO**.

- Step 1 – entity requests registration as a **Registered Service Provider** (and associated user IDs)
- Step 2 – **NGESO** validates registration and issues user IDs (e*ntity is now a **Registered Service Provider**)*
- Step 3 - entity accedes to **Response Procurement Documentation** (*entity is now a **Registered Response Participant**)*
- Step 4 – entity submits one or more assets for pre-qualification as an **Eligible Unit**, specifying the **Auction Product**(s) for which its seeks prequalification
- Step 5 – **NGESO** undertakes any necessary asset testing and validation
- Step 6 – **NGESO** confirms completion of prequalification process (a*ssets are now **Eligible Assets** for the relevant **Auction Product**(s), capable of being allocated to a **Response Unit**)*
- Step 7 – entity allocates **Eligible Assets** to **Response Units** *(participant can now enter **Response Units** into daily auctions for the applicable **Auction Products**)*

Except where the contingency procedure applies, all of the above steps (which are summarised below) are to be completed via the **Single Market Platform**, and the participant must ensure that all information submitted on the **Single Market Platform** is fully complete and correct.

In the event that the **Single Market Platform** is unable to be utilised to complete any or all of the above steps, **NGESO** may (at its discretion) implement a contingency procedure and notify this to participants in writing providing as much advance notice as is reasonably practicable in the circumstances. The contingency procedure may include completion of Steps 1, 2 and 3 using Forms A, B and C, copies of which are available on the **Single Market Platform** or will otherwise be made available by **NGESO**, and Steps 4, 5, 6 and 7 by email submission of the 'Response

Provider Data Template' available on request from **NGESO**. The notification from **NGESO** informing participants that the contingency procedure has been implemented shall confirm the manner and timescales in which such documentation is to be submitted to **NGESO**.

References below to the **Single Market Platform** are to be construed as including the contingency procedure where applicable, unless the context otherwise requires.

Registration as Registered Service Provider

Each participant is required to submit its corporate details, together with details of any related entity on whose behalf it is acting as agent.

In addition, where it has not already done so, each participant must ensure that it has completed the necessary vendor setup forms that are outlined on **NGESO**'s Settlement webpage to be set up as a vendor on **NGESO**'s systems. These should be submitted as soon as possible so that **NGESO** can make payments in a timely manner in accordance with the **Response Service Terms**.

Registration as Registered Response Participant

To be registered as a **Registered Response Participant** with eligibility to pre-qualify and allocate **Eligible Assets** for participation in the **Auctions**, a participant must accede to the **Response Procurement Documentation** via the **Single Market Platform**.

Pre-qualification of Eligible Assets

For asset prequalification, **NGESO** will require submission via the **Single Market Platform** of all relevant technical details associated with the asset to enable **NGESO** to complete any necessary asset testing and validation for the relevant **Auction Product**. The **Registered Service Provider** must also submit a testing approval report for each asset, which must be completed by an **Independent Technical Expert** (**ITE**), as described in the **Testing Rules**.

Eligible Assets will not normally be pre-qualified to an **Auction Product** if they have a condition in their DNO connection agreement whereby they are signed up to an Active Network Management (ANM) Scheme / Flexibility Connection. However, **NGESO** will consider this on a case by case basis and may (at its sole discretion) enable such participation if there is reasonable evidence to demonstrate that the asset has very high forecasted availability (for example as shown by Curtailment Assessment Reports from DNOs). **NGESO** shall continue to keep this under review and any changes to this position shall be consulted accordingly.

Allocation to Response Units

Registered Response Participants are able to create **Response Units** for each **Auction Product** via the **Single Market Platform**. When allocating **Eligible Assets** to **Response Units**, **Registered Response Participants** are required to identify the technical parameters associated with each **Response Unit.**

Every **Response Unit** created on the **Single Market Platform** must have at least one **Eligible Asset** allocated to it to be capable of participating in the daily auctions.

A **Response Unit** can only have allocated to it multiple **Eligible Assets** if they are all located within the same group **Grid Supply Point**, although **NGESO** may (at its discretion) determine that, for system operational reasons, this restriction may need to be increased to require multiple **Eligible Assets** allocated to a **Response Unit** to be located within the same **Grid Supply Point**.

Timescales

Initial registrations must be completed in line with the timings outlined below:

Activity	Provider	NGESO
Pre-qualification of **Eligible Assets**	In order to enable allocation activity, valid and complete data should be submitted 13 calendar days in advance.	Allocation activity can take place 13 calendar days after submission of validly completed data. **NGESO** will notify the **Registered Service Provider** if allocation activity can be accommodated sooner.
Allocation of **Eligible Assets** to **Response Units**	Allocation can only occur on a weekly basis and must be sent to **NGESO** in the "market window" on a Monday (see further below)	Deemed accepted upon submission, subject to errors and/or incomplete data New/updated **Response Units** can participate in daily auctions from and including that for **Service Days** commencing 23.00 hours the following Thursday

Changes to pre-qualification status or allocation

If **Registered Response Participants** wish to change the pre-qualification status and/or allocation to a **Response Unit** of **Eligible Assets**, including introducing new **Eligible Asset**(s) for pre-qualification or increasing the response capacity of an existing pre-qualified **Eligible Asset**, this must be done as described above (on the **Single Market Platform** or using any contingency arrangements where applicable). Any increase in capacity of an existing **Eligible Asset** must be accompanied by a testing approval report in the same manner as for new **Eligible Assets**.

Allocation of **Eligible Assets** to **Response Units**, whether submitted via the **Single Market Platform** or using the 'Response Provider Data Template' (where the contingency arrangements apply) are only processed by **NGESO** on a weekly basis, and can only therefore be submitted in the stipulated daily "market window" ending on Monday each week. The market window is the period from 15.00 hours on a calendar day to 10.00 hours on the next calendar day (and where this document refers to a market window for a particular calendar day, unless otherwise indicated that is a reference to the market window which ends on that day). Any submissions from **Registered Response Participants** received outside this market window will be rejected, and so will not be applicable, and must be resubmitted in the next following Monday market window.

For the avoidance of doubt, allocation submissions are not required to be made every week. Once validly submitted, a subsequent submission is only required should any information change. As explained above, any updates submitted during the Monday market window will not become effective until the **Service Day** commencing 23.00 hours on the following Thursday.

All queries and communications shall be made via a **Registered Response Participant**'s account manager or commercial.operation@nationalgrideso.com.

Schedule 3 - Testing

All assets seeking to pre-qualify as **Eligible Assets** will be required to pass testing prior to pre-qualification. For all **Auction Products**, testing will be the responsibility of the **Registered Response Participant** and subject as provided below should be undertaken/verified by an **Independent Technical Expert** (**ITE**). Testing is required at 20Hz or 2Hz depending on the service being tested. Please note that a single duration test can be used for all **Response Services** (i.e., DC, DM and DR) provided the duration test is for the longest duration required by any service, e.g. the duration test of 60 minutes for DR can be used for DM and DC.

NGESO will require an **ITE** approval report as part of any submission of an **Eligible Asset** for pre-qualification. The report shall be deemed accepted by **NGESO** once submitted. However, should any queries be raised the **Eligible Asset** shall not be capable of being allocated to a **Response Unit** for participation in the daily auctions until any queries have been satisfied.

Testing shall also be required before the registered response capacity of an existing **Eligible Asset** can be increased.

All example graphs in this Schedule 3 are for illustrative purposes only.

Part 1 - Dynamic Containment Test Requirements

The **Dynamic Containment** tests assess the capability of the **Registered Response Participant** to deliver dynamic response in accordance with a **Response Contract**.

Service description

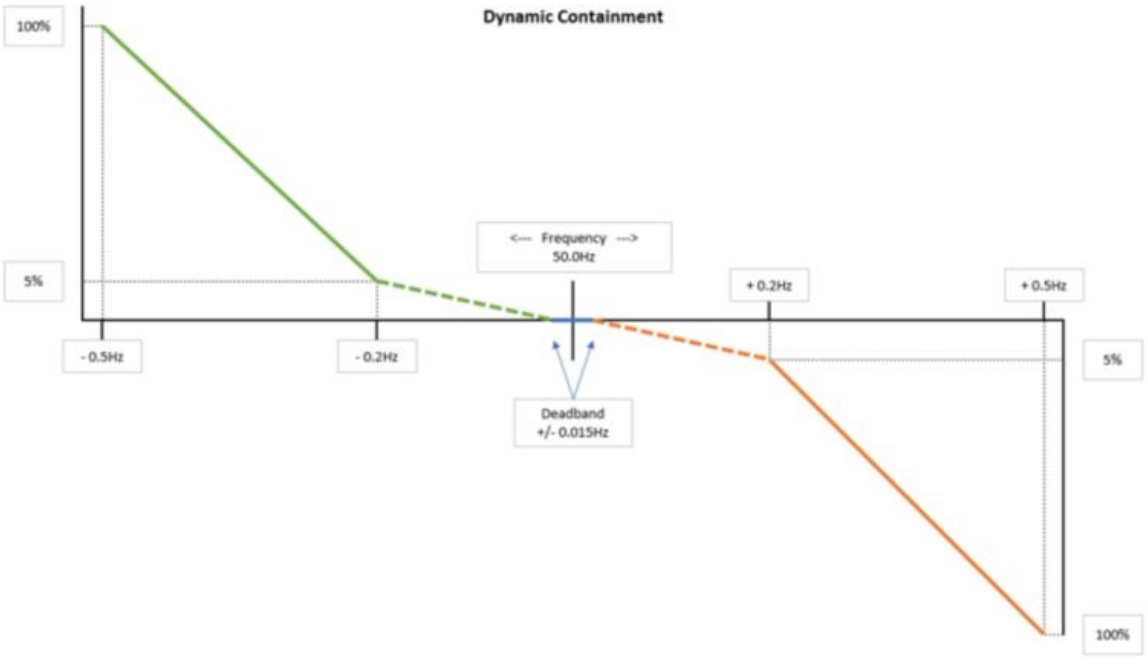
Dynamic Containment is a fast-acting frequency response service to contain frequency within the statutory range of +/-0.5Hz in the event of a sudden demand or generation loss. The service delivers very quickly and proportionally to frequency deviation.

Table 1- Dynamic Containment Service Specification

Service specification	***Details***
Deadband delivery	*0% (+/- 0.015Hz)*
Small linear delivery	*Between 0.015Hz and 0.2Hz (maximum of 5% at 0.2Hz)*
Knee point activation	*+/- 0.2Hz is 5%*
Full delivery	*+/- 0.5Hz is 100%*
Linear delivery knee point	*0.2Hz*
Full activation	*0.5Hz*
Full delivery	*1s*

For more details see: https://www.nationalgrideso.com/industry-information/balancing-services/frequency-response-services/dynamic-containment

Figure 1 – Dynamic Containment Delivery Requirements


Dynamic Containment
100%
5%
<--- Frequency --->
50.0Hz
+ 0.2Hz
+ 0.5Hz
- 0.5Hz
- 0.2Hz
5%
Deadband
+/- 0.015Hz
100%

Dynamic Containment Test Requirements

The **Dynamic Containment** tests assess the capability of the **Plant** and **Apparatus** to deliver dynamic response in accordance with the balancing service contract.

Tests 1, 2 and 3 assess response against injected frequency profiles. Test 4 assesses response whilst connected to live system frequency. The frequency profile can be injected either at site or remotely. The minimum sample rate for all tests is 20Hz. See Appendix A for information on test signals.

Test 1 – Step Test

The purpose of Test 1 is to assess the ability of the **Plant** and **Apparatus** to deliver the required response at discreet frequency deviations.

The frequency injections to be used are shown in Figure 2 and Table 2 below.

Table 9 - Test 1 Frequency Injection Profile corresponding with times

Test	Parameter	Values					
	Time /s	0	30	30	210	210	240
1.1	Frequency /Hz	50	50	50.01	50.01	50	50
1.2	Frequency /Hz	50	50	49.99	49.99	50	50
1.3	Frequency /Hz	50	50	50.02	50.02	50	50
1.4	Frequency /Hz	50	50	49.98	49.98	50	50
1.5	Frequency /Hz	50	50	50.1	50.1	50	50
1.6	Frequency /Hz	50	50	49.9	49.9	50	50
1.7	Frequency /Hz	50	50	50.2	50.2	50	50
1.8	Frequency /Hz	50	50	49.8	49.8	50	50

- Each step is sustained for 180 seconds to verify the response.
- The frequency will then be returned to 50Hz for a minimum of 30 seconds, or until the output is stable, before the next injection is applied.
- The minimum sample rate for Test 1 is 20Hz.

Pass Criteria for Test 1

- For Tests 1.1 and 1.2, the **Plant** and **Apparatus** should not provide any response within the deadband. Where there are any non-zero values here these need to be explained by the ITE in the test report using the comments field.
- For tests 1.3 and 1.4 all that is required is a noticeable change in power in the correct direction.
- For Tests 1.5 to 1.12 the active power response within each 3 minute timescale should fall within tolerances shown in
- **Table 3** and shown graphically in **Figure 3**. (Performance monitoring criteria used to calculate tolerance bands)
- A response following a change of frequency should occur before 0.55 seconds.
- Delivery of active power due to a change in frequency should be achieved in the required timescale.
- The Unit should monotonically progress to its required response.

Figure 2 - Test 1

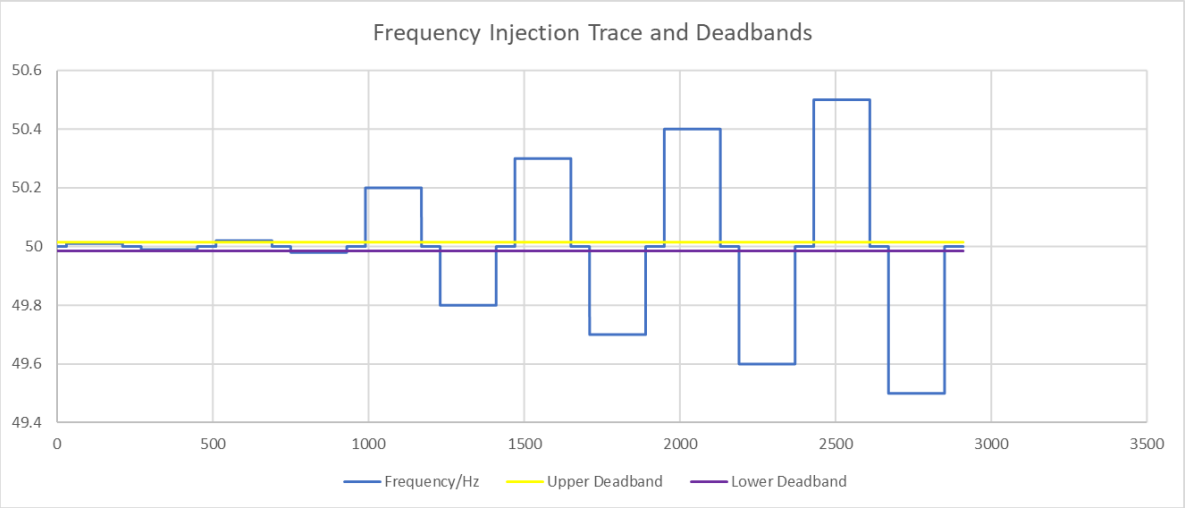


Table 2 - Test 1 Frequency Injection Profile corresponding with times

Test	Parameter	Values					
	Time /s	0	30	30	210	210	240
1.1	Frequency /Hz	50	50	50.01	50.01	50	50
1.2	Frequency /Hz	50	50	49.99	49.99	50	50
1.3	Frequency /Hz	50	50	50.02	50.02	50	50
1.4	Frequency /Hz	50	50	49.98	49.98	50	50
1.5	Frequency /Hz	50	50	50.2	50.2	50	50
1.6	Frequency /Hz	50	50	49.8	49.8	50	50
1.7	Frequency /Hz	50	50	50.3	50.3	50	50
1.8	Frequency /Hz	50	50	49.7	49.7	50	50
1.9	Frequency /Hz	50	50	50.4	50.4	50	50
1.10	Frequency /Hz	50	50	49.6	49.6	50	50
1.11	Frequency /Hz	50	50	50.5	50.5	50	50
1.12	Frequency /Hz	50	50	49.5	49.5	50	50

Table 3 - Test 1 Frequency Injection and expected response value.

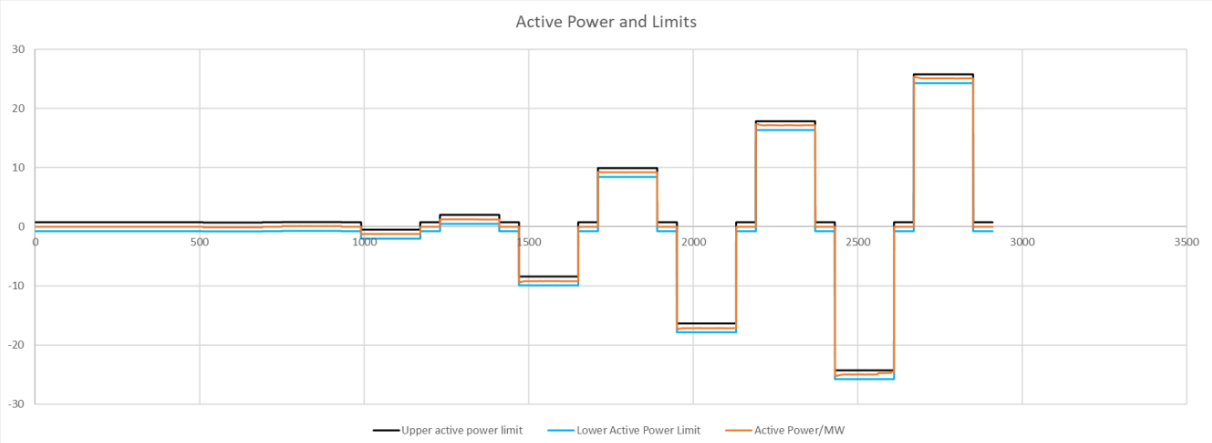
For values with an asterisk(*) a noticeable change in power in the correct direction is all that is required.

Test Number	Frequency Step	Expected Response	Allowable Power Tolerance (% of Maximum Contracted)
1.1	50.01	0%	n/a

1.2	49.99	0%	n/a
1.3	50.02	0.135%	*
1.4	49.98	0.135%	*
1.5	50.2	5%	+/- 3%.
1.6	49.8	5%	+/- 3%.
1.7	50.3	37%	+/- 3%.
1.8	49.7	37%	+/- 3%.
1.9	50.4	68%	+/- 3%.
1.10	49.6	68%	+/- 3%.
1.11	50.5	100%	+/- 3%.
1.12	49.5	100%	+/- 3%.

For values with an asterisk (*) a noticeable change in power in the correct direction is all that is required.

Figure 3 Graphical representation of tolerance bands for the expected response at different frequencies – sample data



Test 2 – Frequency Sweep Test

Test 2 assesses the performance of the **Plant** and **Apparatus** against a varying frequency over the entire performance envelope.

- The frequency injections to be used are shown in and Figure 15 and Table 11 below.
- The minimum sample rate for Tests 2.1 and 2.2 is 20Hz.

Pass Criteria for Tests 2.1 and 2.2

- For Test 2.1 and 2.2, active power response is within the tolerances in Figure 16/Figure 17 and Table 12. (Performance monitoring criteria used to calculate tolerance bands)

Figure 4 - Test 2.1

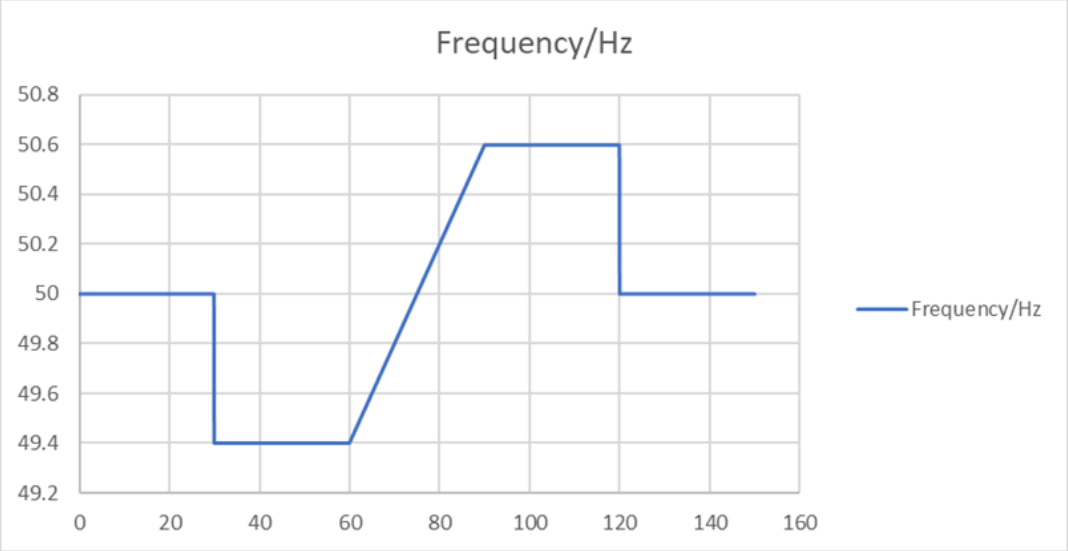


Figure 5 - Test 2.2

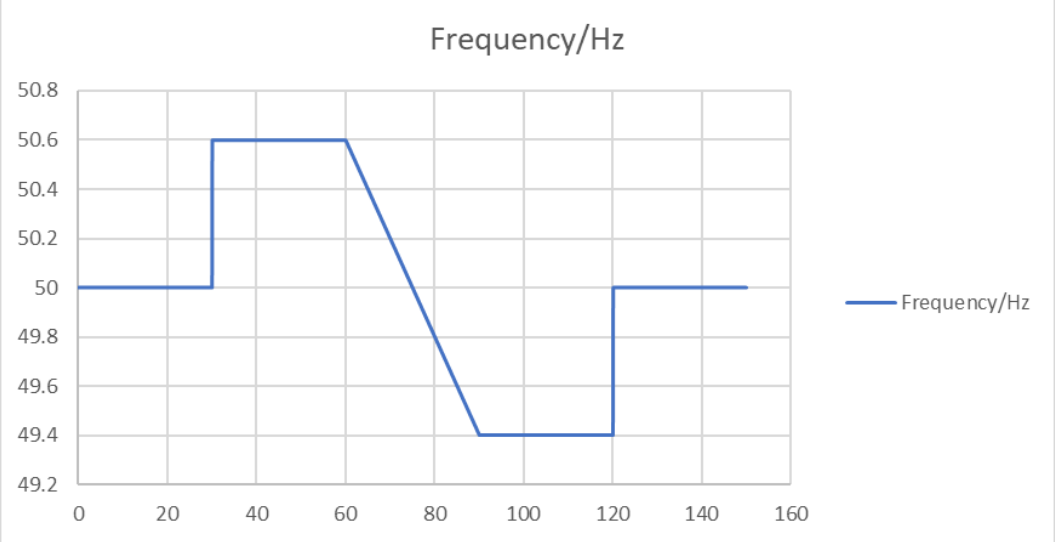


Table 4 - Test 2 Frequency Injection Profiles

Time /s	*Injected Frequency /Hz*	
	Test 2.1	*Test 2.2*
0	*50*	*50*
30	*50*	*50*
30	*49.4*	*50.6*
60	*49.4*	*50.6*
65	*49.6*	*50.4*
70	*49.8*	*50.2*
75	*50*	*50*
80	*50.2*	*49.8*
85	*50.4*	*49.6*
90	*50.6*	*49.4*
120	*50.6*	*49.4*
120	*50*	*50*
150	*50*	*50*

Figure 6 - Test 2.1 Tolerance

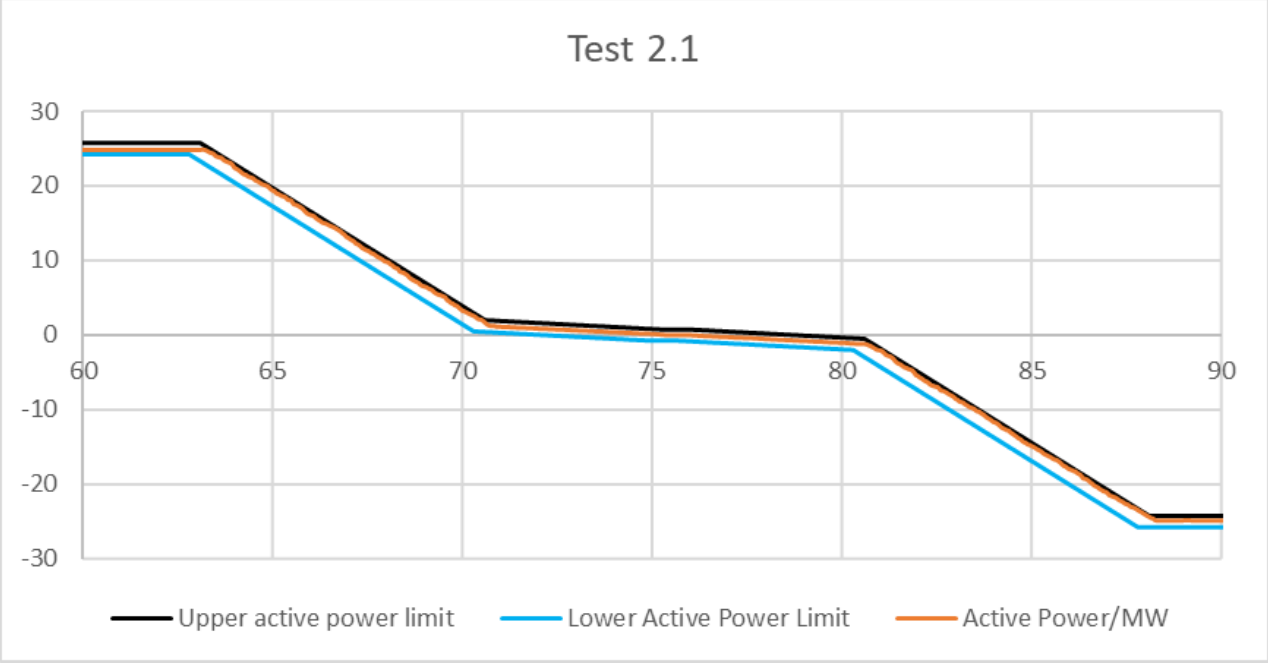


Figure 7 - Test 2.2 Tolerance

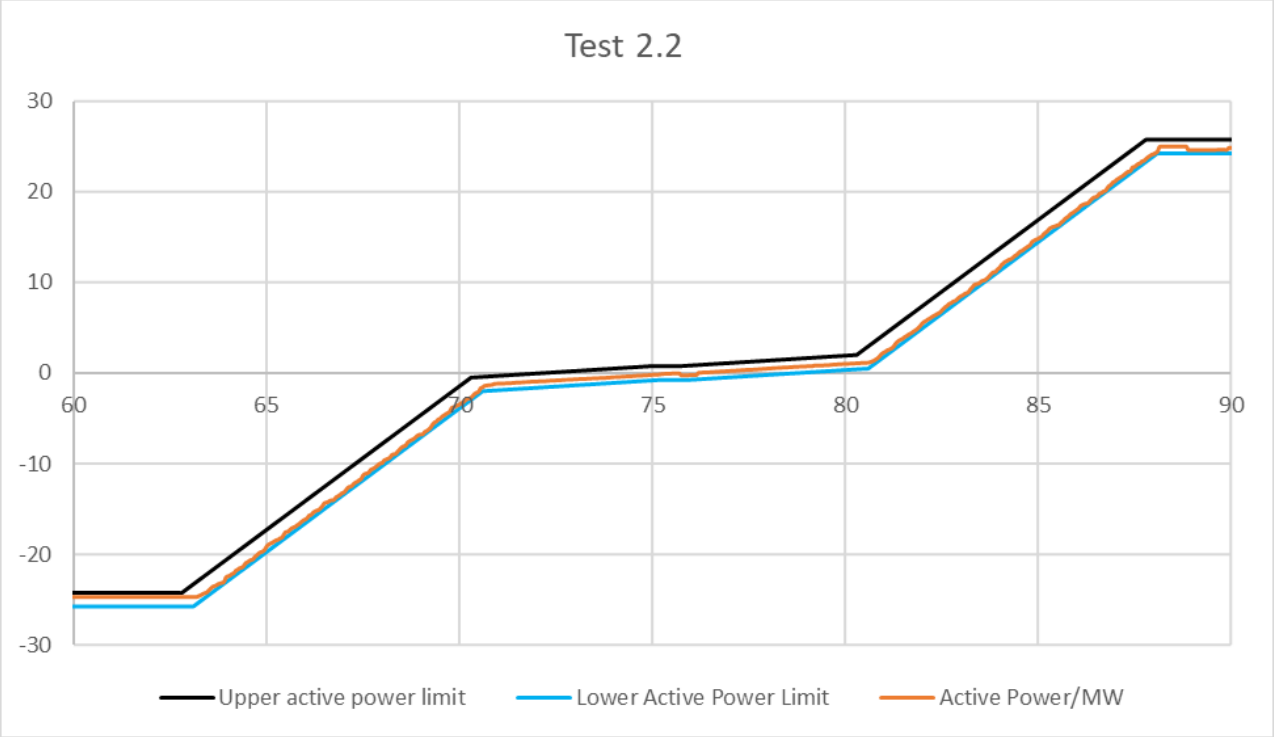


Table 5 **- Test 2.1 and 2.2 Sweep Test tolerances (Without time delay to reach required delivery included)**

	Test 2.1 and Test 2.2	
Frequency (Hz)	Expected Percentage Active Power Response(%)	Tolerance (% of Maximum Contracted)
50.6	100	+/-3%
50.5	100	+/- 3%.
50.4	68.3	+/- 3%.
50.3	36.7	+/- 3%.
50.2	5	+/- 3%.
50.1	2.3	+/- 3%.
50	0	0%
49.9	2.3	+/- 3%.
49.8	5	+/- 3%.
49.7	36.7	+/- 3%.

49.6	68	+/- 3%.
49.5	100	+/- 3%.
49.4	100	+/- 3%.

Test 3 Duration Test

Test 3 assesses the ability of the **Plant** and **Apparatus** to sustain full response for 15 minutes.

- Operation will be tested at ±100% of capability to ensure the system is compliant.
- This is carried out by a frequency step of ±0.6Hz onto the system for 15 minutes.
- The frequency injection profiles are shown in **Figure 18** and **Figure 19** and **Table 13** and **Table 14** below

Pass criteria for test 3:

- The standard deviation of load error at steady state over a 900 second period must not exceed 2.5% of the maximum contracted active power.
- Sustain response for 15 minutes.

Figure 8 Test 3.1 Injection Profile

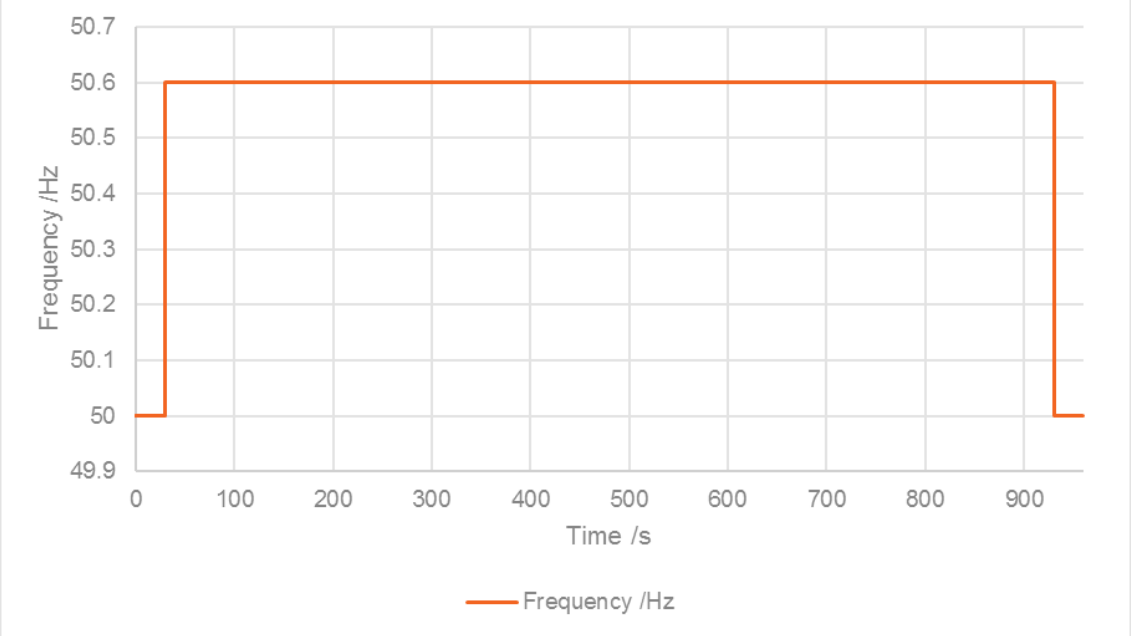


Figure 9 Test 3.2 Injection Profile

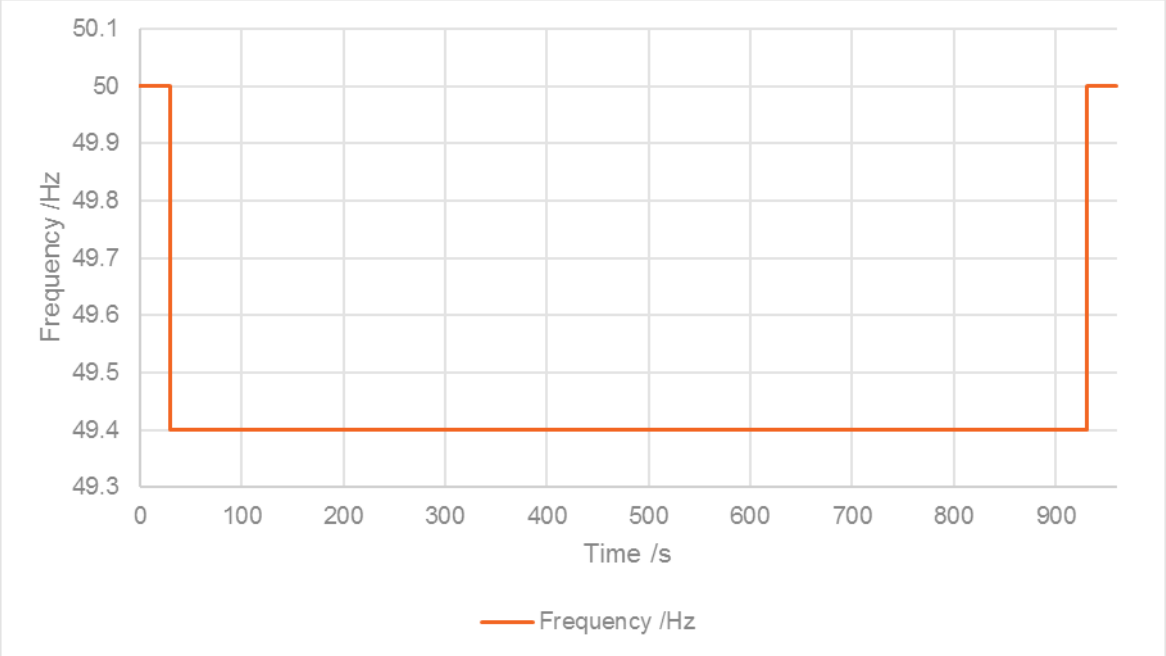


Table 6: Test 3.1 Frequency Injection Table Corresponding with times

	Test 3.1 Frequency injection table					
Time /s	*0*	*30*	*30*	*930*	*930*	*960*
Frequency /Hz	*50*	*50*	*50.6*	*50.6*	*50*	*50*

Table 7: Test 3.2 Frequency Injection Table Corresponding with times

	Test 3.2 Frequency injection table					
Time /s	*0*	*30*	*30*	*930*	*930*	*960*
Frequency /Hz	*50*	*50*	*49.4*	*49.4*	*50*	*50*

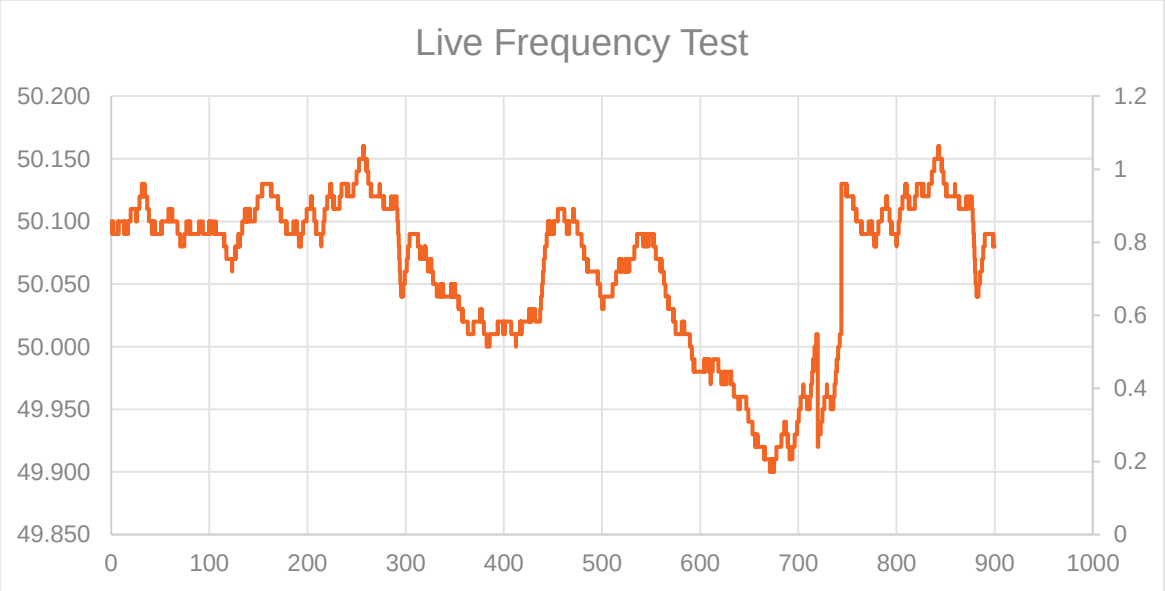
Test 4 – Live System Frequency Response Test

Test 4 assesses the response of the **Plant** and **Apparatus** to system frequency in a live environment. The minimum sample rate for this test is 20Hz and duration is 15 minutes where system frequency and active power response will be recorded. As part of test 4, the **Registered Response Participant** is required to provide evidence that the protection settings are in line with the Grid Code (+/- of 5% of 50Hz).

Pass Criteria for Test 4

- Provide an active power response consistent with the contracted performance within timescales.
- Provide evidence protection setting comply with Grid Code.

Figure 10 - Sample System Frequency



Appendix A – Test Signals

The limits of error and minimum sample rates for testing are shown below in Table 8. All success criteria are subject to the stated limit of error/accuracy threshold.

Table 8 - Limits of error and minimum sample rates for Dynamic Service Testing

	Limit of error/ Accuracy threshold	Minimum Sample rate Test 1	Minimum Sample rate Tests 2 and 3
Injection Frequency (Hz)	±0.01 Hz	20Hz	20Hz
Active Power (MW)	Please see pass criteria	20Hz	20Hz
	Limit of error/ Accuracy threshold	Minimum Sample rate Test 4	
Measured System Frequency (Hz)	±0.001 Hz	20Hz	
Active Power (MW)	Please see pass criteria	20Hz	

Simulations / simulated tests are not permitted. Each test submitted must record real time data from the plant and sites under test: The test data submitted must come from the specific site to be contracted; substituted data will not be accepted. Test results must not be changed before submission for analysis.

Test Signals

In ALL cases, the data should record ALL required signals for at least 30 seconds BEFORE the application of the frequency injection signal and for at least 30 seconds AFTER the completion of the test.

For ALL services, the data for the following signals will need to be provided

a) Time
b) Active Power
c) System Frequency or Injected frequency as appropriate
d) Any other relevant signals that may affect the success criteria such as Relay Logic for non-dynamic.

Appendix B - Dynamic Containment Test Data Format

Figure 11 - Sample Dynamic Containment Test Data Format

Provider	Company Name	
Date	xx-xx-xxxx	
Test	1	
Service	Dynamic Containment	
Location	AA	
Site	AA	
Time (s)	Injected Frequency (Hz)	Measured Power (MW)
0	50.00	0.000
0.05	50.00	0.000
0.1	50.00	0.000
0.15	50.00	0.000
0.2	50.00	0.000
0.25	50.50	5.000
0.3	50.50	5.000
0.35	50.50	5.000
0.4	50.50	5.000
0.45	50.50	5.000
0.5	50.50	5.000
0.55	50.50	5.000
0.6	50.00	0.000
0.65	50.00	0.000
0.7	50.00	0.000
0.75	50.00	0.000
0.8	50.00	0.000

- Frequency Injection should be to 2 decimal places
- Measured Power should be to 3 decimal places
- Measured frequency for test 4 should be to 3 decimal places

Further columns can be added to include data for several sites if required.

For Test 4 replace ‘Injected Frequency’ with ‘Measured Frequency’.

Appendix C – Dynamic Containment Test Assessment

Excel Analysis Tool published with User Guide.

See Test certificate template in Appendix D for further guidance.

Appendix D – Dynamic Containment Test Certificate Template

Please use this Test Certificate format and submit to NGESO, along with the test data and CV of the ITE employed by the prospective response provider.

Prospective Response Provider Company Details

Contracted company name
Primary contact name
Contact number/s
Email address

Contract Details

Contract ID	
Service type	
Asset type, e.g. diesel generator, battery etc	
Unit make up, e.g. single or aggregated	*Describe here what is included in this test e.g. Single asset, group of assets, asset/s being assessed within an existing Unit.*
Aggregation methodology (if appropriate)	
Unit location / ID	
Do any assets associated with this report have a condition in their DNO connection agreement whereby they are signed up to an Active Network management (ANM) Scheme / Flexibility Connection? If yes, please ensure contracted party speaks to their ESO account manager.	
Contract signed date	
Service start date	
Test date	

Dynamic Service Details (*example here is for a 5MW Unit*)

Deadband	±0.015Hz
Response / MW	5

Test Results

Further relevant test description/commentary here

Test	Pass Criteria	Pass/Fail	Comment
1.1, 1.2	No delivery within deadband. Where there are any non-zero values here these need to be explained by the ITE in the test report using the comments field.		
1.3,1.4	For Test 1.3 and 1.4 a noticeable change in active power in the correct direction is all that is required.		
1.5-1.12	Active power response within each 3 minute timescale remains within tolerances.	Pass	Note result here (See Figure …)
1.5-1.12	A response following a change of frequency should occur before 0.55 seconds.		
1.5-1.12	Delivery of active power due to a change in frequency is achieved in the required timescale	Pass	
1.5-1.12	The Unit should monotonically progress to its required response	Pass	
2.1 2.2	Active power response is within the allowed tolerances.	Pass	Show in figure below with tolerance bands overlaid.
3	Response is sustained for 15 minutes	Pass	Refer to figures
3	The standard deviation of load error at steady state over a 900 second period must not exceed 2.5% of the maximum contracted active power.	Pass	Standard deviation is assessed from 1 second until 900 seconds after the frequency step.
4	Provide an active power response consistent with the contracted performance timescales.		Figure should show the active power following frequency as expected.
	Overall Test Result		

Test Result Graphs

Plot frequency injection and active power response vs time for each test.

Figure 1 – Test 1 Active Power Response

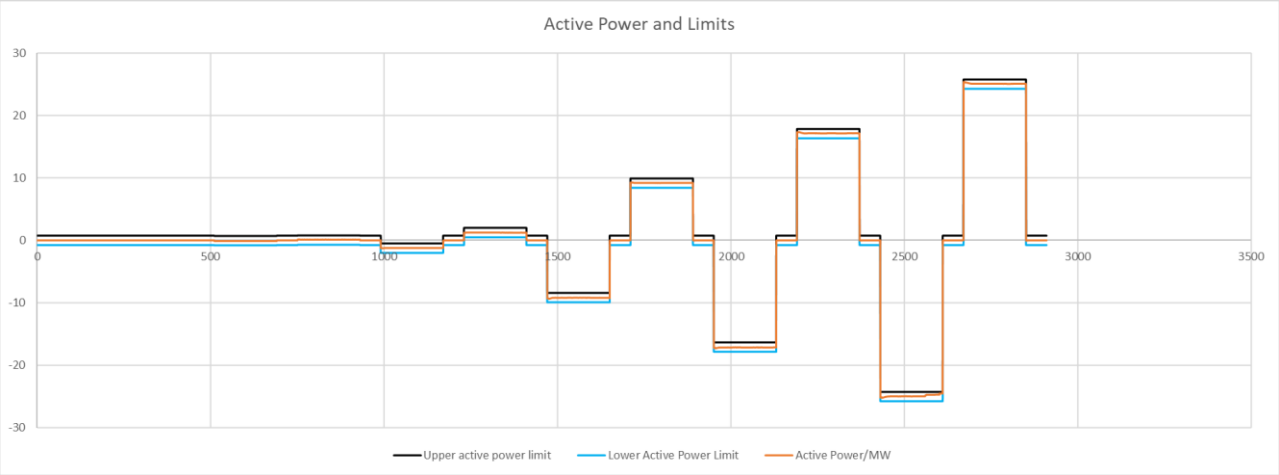


Figure 2 – Test 1.1

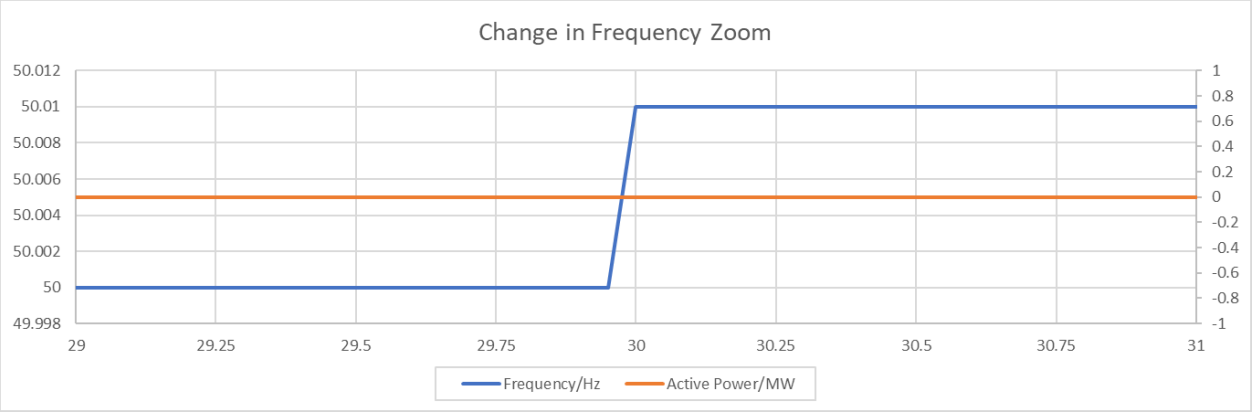


Figure 3 – Test 1.3

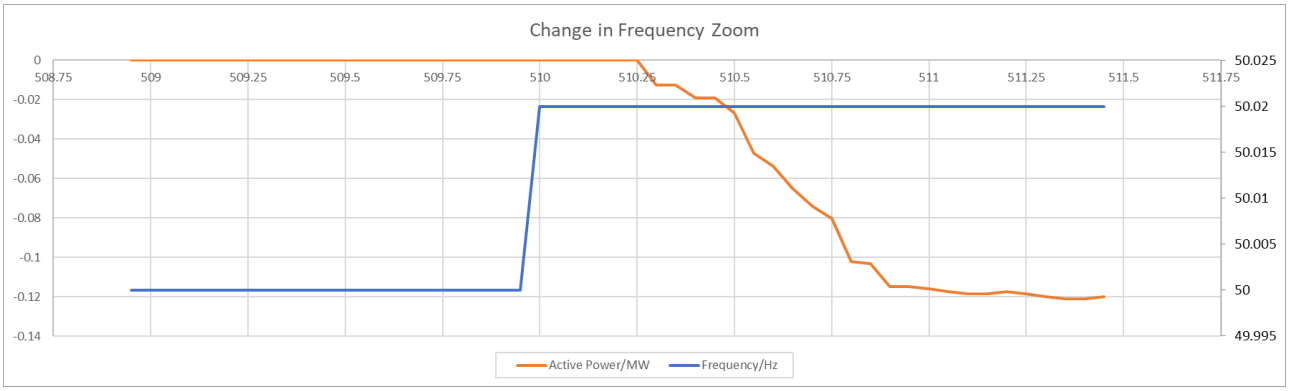


Figure 4 – Test 1.5

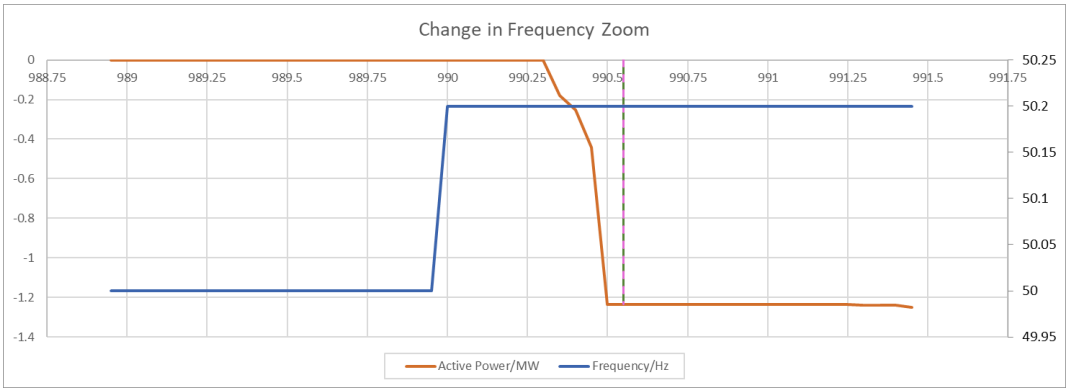


Figure 5 – Test 1.11

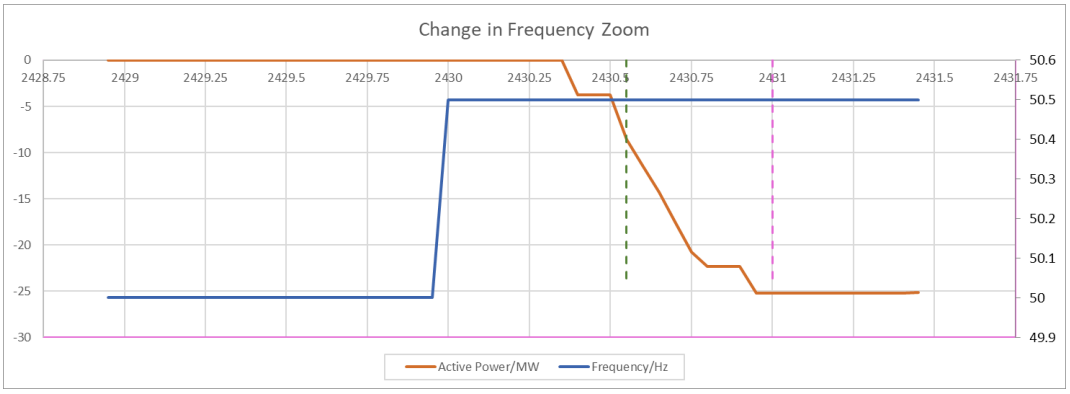


Figure 6 – Test 2.1

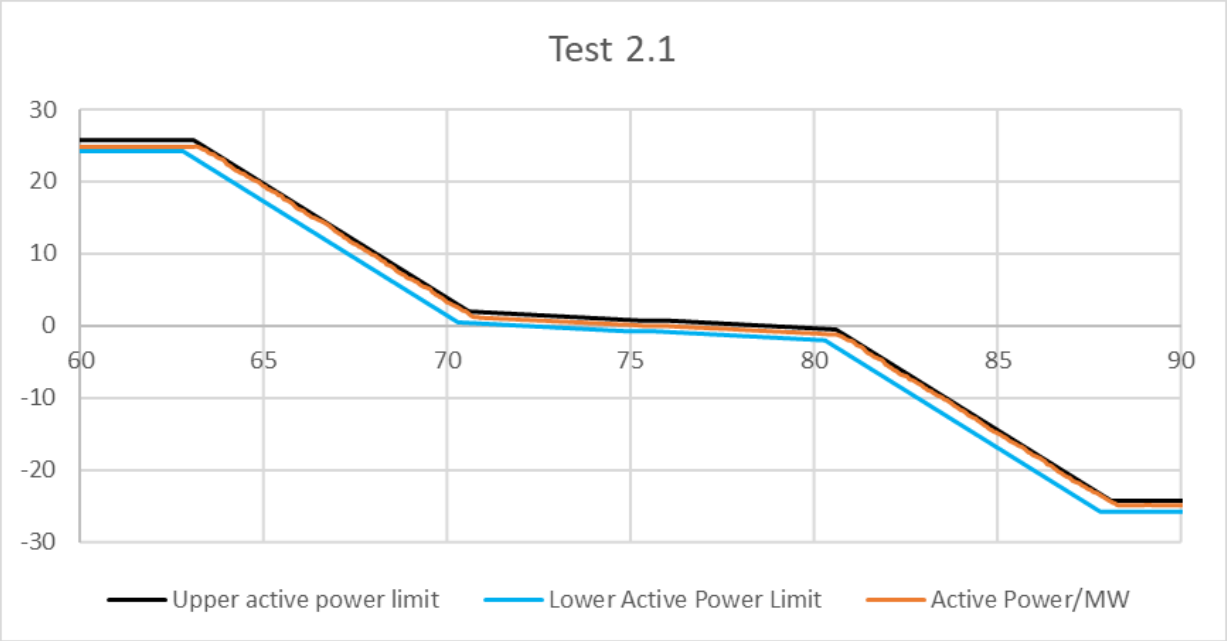


Figure 7 – Test 2.2

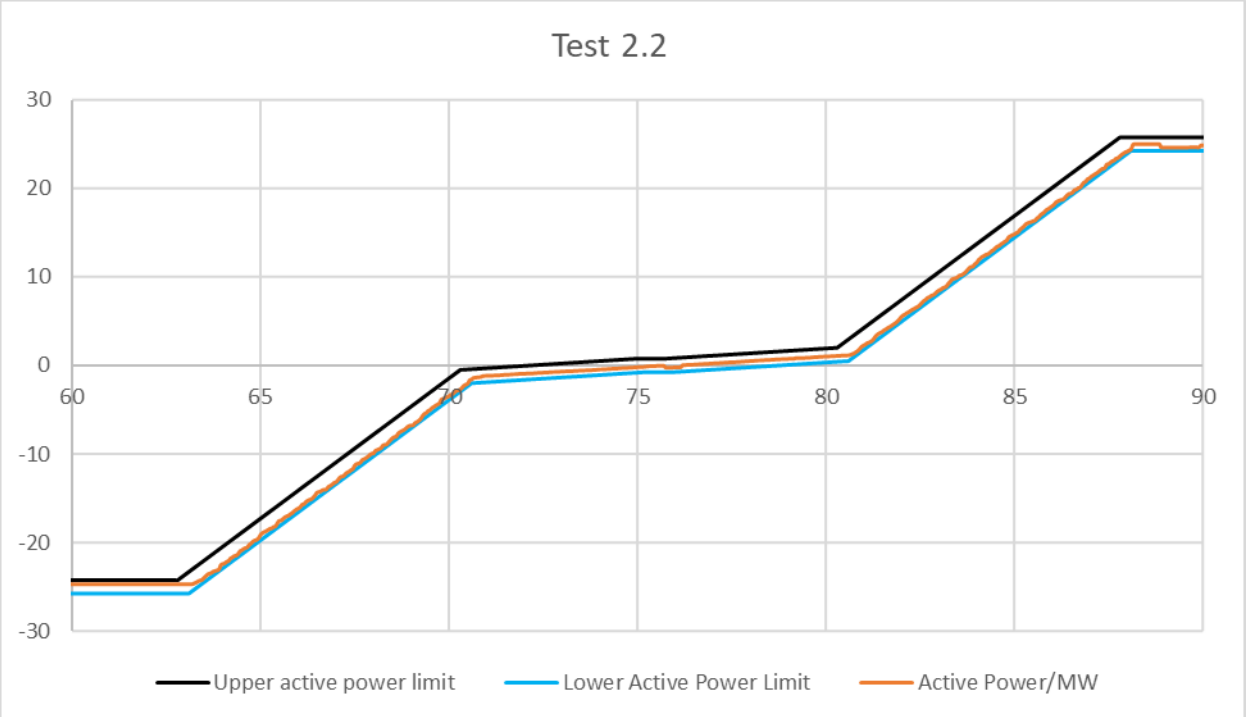


Figure 8 – Test 3.1

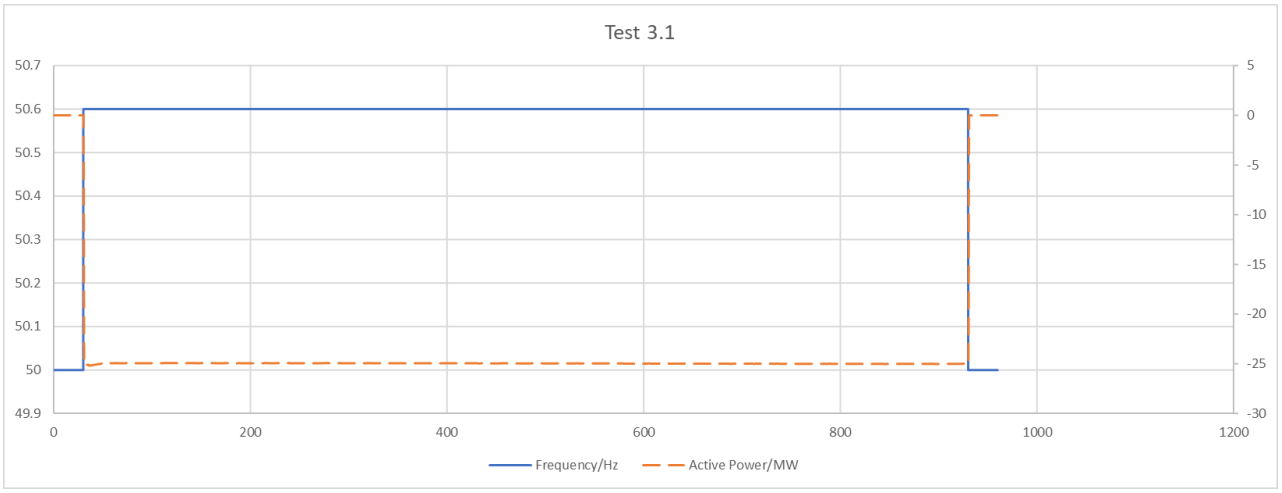


Figure 9 – Test 3.2

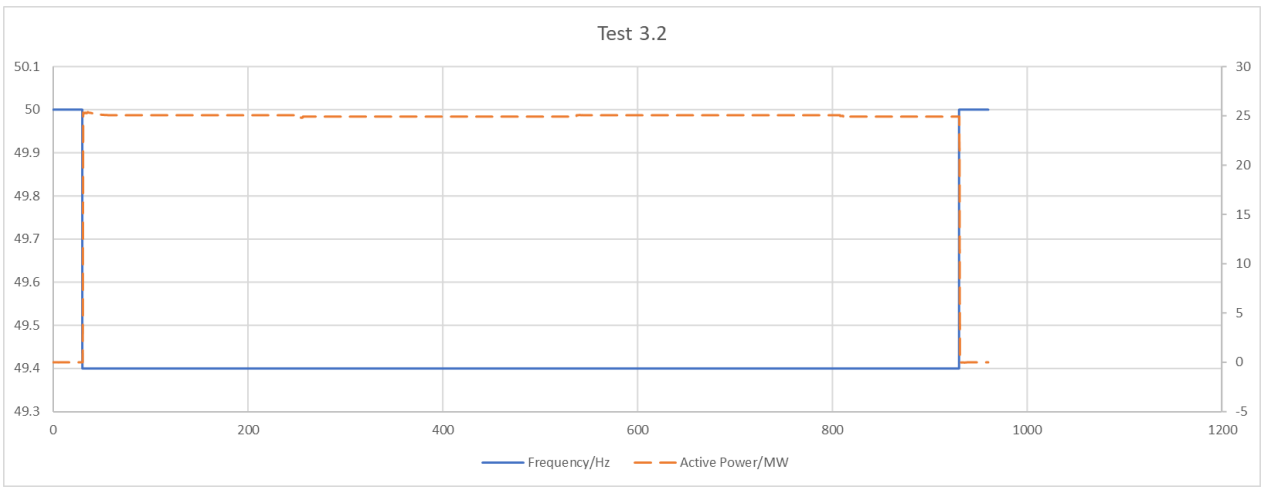
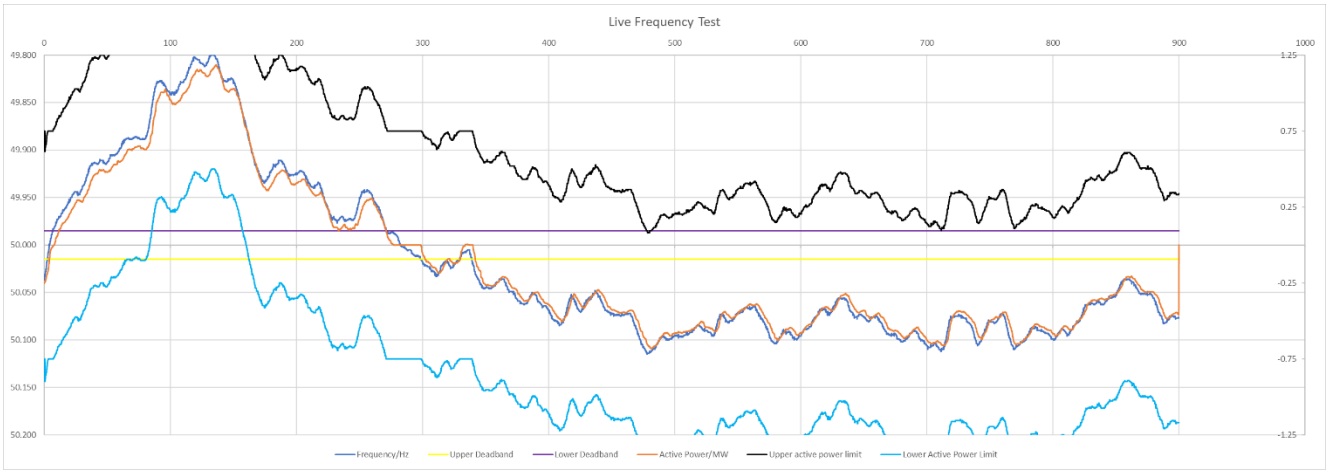


Figure 10 – Test 4



Independent Technical Expert (ITE) Details

Company name
Primary contact name
Contact number /s
Email address
I / We confirm that I / We the following: **(a) I/We am a/are Independent Technical Expert(s) (as defined in Schedule 4 of the NGESO's prevailing Response Procurement Rules;** **(b) I/We have carried out an assessment of the [asset] described above in accordance with the testing guidelines set out in the Response Procurement Rules** **(c) the above details are, to my/our best knowledge and belief, true, accurate, complete and not misleading; and** **(d) the CV attached of my/our experience is to my/our best knowledge and belief, true, accurate, complete and not misleading.**
Signed: Date:

Part 2 - Dynamic Moderation Test Requirements

The **Dynamic Moderation** tests assess the capability of the **Registered Response Participant** to deliver dynamicresponse in accordance with a **Response Contract**.

Tests 1, 2 and 3 assess response against injected frequency profiles. Test 4 assesses response whilst connected to live **System Frequency**. The frequency profile can be injected either at site or remotely. The minimum sample rate for all tests is 20Hz. See Appendix A for information on test signals.

Aggregation/Test Approach

These tests are designed to meet the **NGESO** requirement for service validation as well as being equally suitable for all types of **Plant and Apparatus** (both single-site or multi-site) and technology types (generation, storage, demand or a combination of same). The tests also consider how **Registered Response Participants** add to and evolve their aggregated portfolios over time can have additional assets validated.

The dynamic tests can assess the capability of

- A single asset
- A group of assets
- Asset/s to be added to an existing aggregated facility

Test 1 – Step Test

The purpose of Test 1 is to assess the ability of the **Plant** and **Apparatus** to deliver the required response at discreet frequency deviations.

The frequency injections to be used are shown in **Figure *12*** and below.

- Each step is sustained for 180 seconds to verify the response.

- The frequency will then be returned to 50Hz for a minimum of 30 seconds, or until the output is stable, before the next injection is applied.
- The minimum sample rate for Test 1 is 20Hz.

Pass Criteria for Test 1

- For Tests 1.1 and 1.2, the **Plant** and **Apparatus** should not provide any response within the deadband. Where there are any non-zero values here these need to be explained by the **ITE** in the test report using the comments field.
- For tests 1.3 and 1.4 all that is required is a noticeable change in power in the correct direction.
- For Tests 1.5 to 1.8 the active power response within each 3 minute timescale should fall within tolerances shown in **Table 3** and shown graphically in **Figure 3.**
- (Performance monitoring criteria used to calculate tolerance bands)
- A response following a change of frequency should occur before 0.5 second.
- Delivery of active power due to a change in frequency should be achieved in the required timescale.
- The **Plant** and **Apparatus** should monotonically progress to its required response.

Figure 12 - Test 1

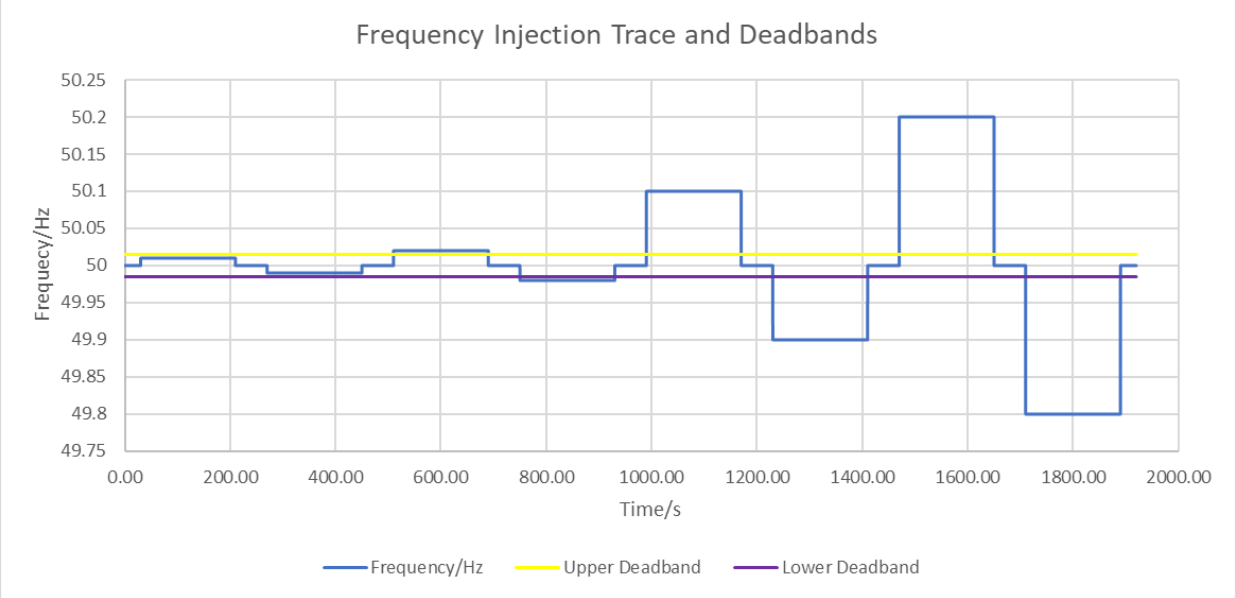


Table 9 - Test 1 Frequency Injection Profile corresponding with times

Test	Parameter	Values					
	Time /s	0	30	30	210	210	240
1.1	Frequency /Hz	50	50	50.01	50.01	50	50
1.2	Frequency /Hz	50	50	49.99	49.99	50	50
1.3	Frequency /Hz	50	50	50.02	50.02	50	50
1.4	Frequency /Hz	50	50	49.98	49.98	50	50

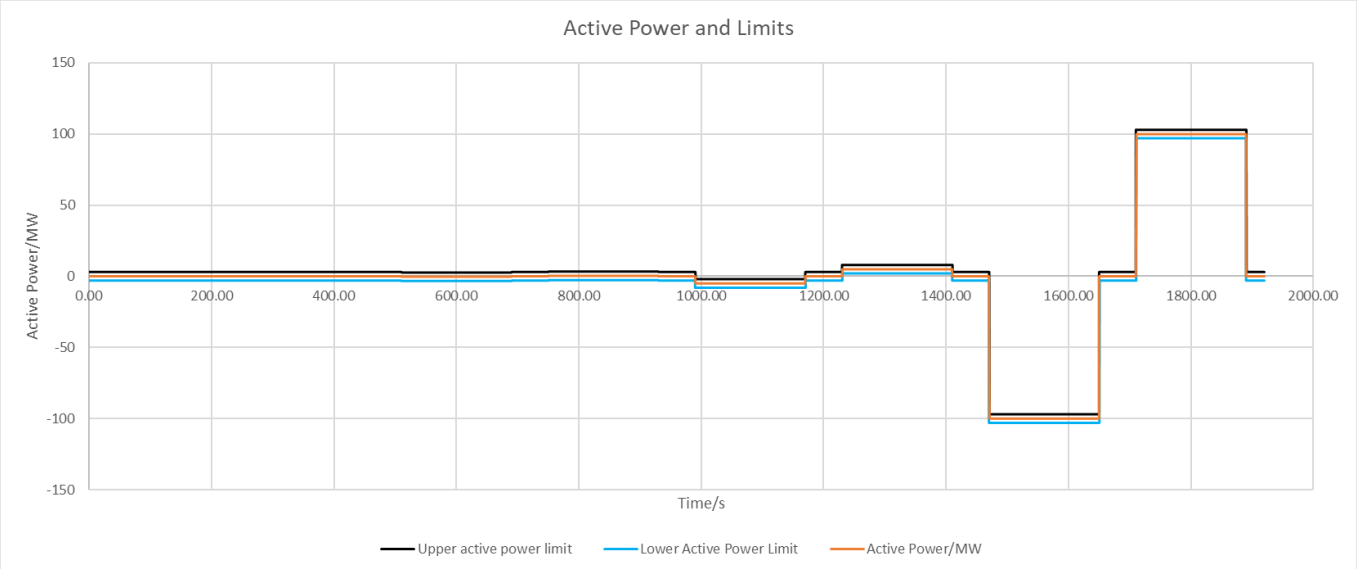
1.5	**Frequency /Hz**	50	50	50.1	50.1	50	50
1.6	**Frequency /Hz**	50	50	49.9	49.9	50	50
1.7	**Frequency /Hz**	50	50	50.2	50.2	50	50
1.8	**Frequency /Hz**	50	50	49.8	49.8	50	50

Table 10 - Test 1 Frequency Injection and expected response value.

Test Number	Frequency Step	Expected Response	Allowable Power Tolerance (% of Maximum Contracted)
1.1	50.01	0%	n/a
1.2	49.99	0%	n/a
1.3	50.02	0.135%	*
1.4	49.98	0.135%	*
1.5	50.1	5%	± 3%
1.6	49.9	5%	± 3%
1.7	50.2	100%	± 3%
1.8	49.8	100%	± 3%

For values with an asterisk (*) a noticeable change in power in the correct direction is all that is required.

Figure 13 - Graphical representation of tolerance bands for the expected response at different frequencies – sample data



Test 2 – Frequency Sweep Test

Test 2 assesses the performance of the **Plant** and **Apparatus** against a varying frequency over the entire performance envelope.

- The frequency injections to be used are shown in

- Figure 14 and Figure *15* and Table *11* below.
- The minimum sample rate for Tests 2.1 and 2.2 is 20Hz.

Pass Criteria for Tests 2.1 and 2.2

- For Test 2.1 and 2.2, active power response is within the tolerances in **Figure 16/Figure 17** and Table 12. (Performance monitoring criteria used to calculate tolerance bands)

Figure 14 - Test 2.1

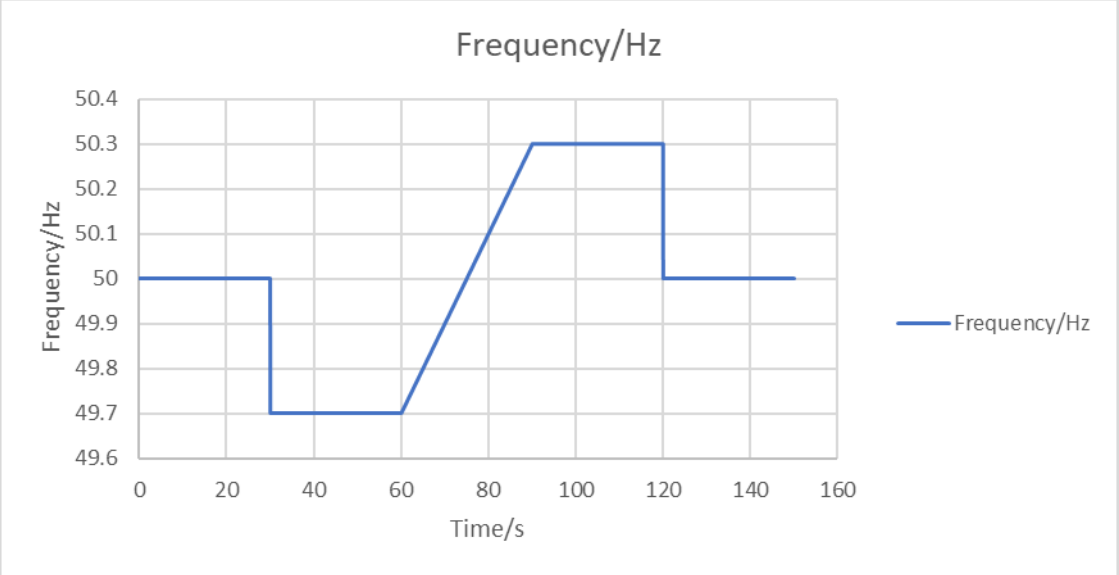


Figure 15 - Test 2.2

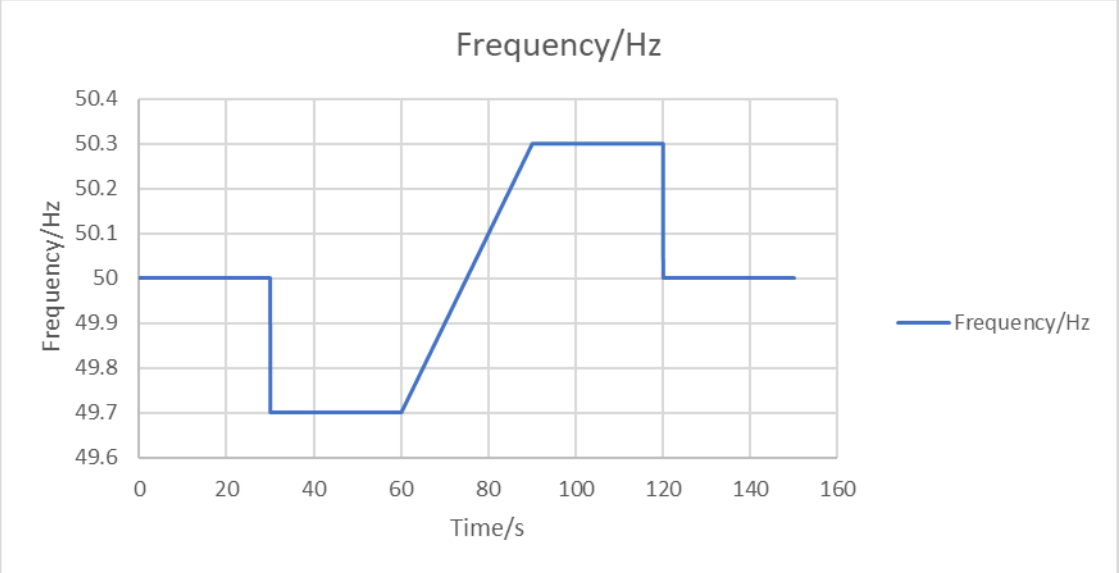


Table 11 - Test 2 Frequency Injection Profiles

Time /s	Injected Frequency /Hz	
	Test 2.1	Test 2.2
0	50	50
30	50	50
30	49.7	50.3
60	49.7	50.3
75	50	50
90	50.3	49.7

120	50.3	49.7
120	50	50
150	50	50

Figure 16 - Test 2.1 Tolerance

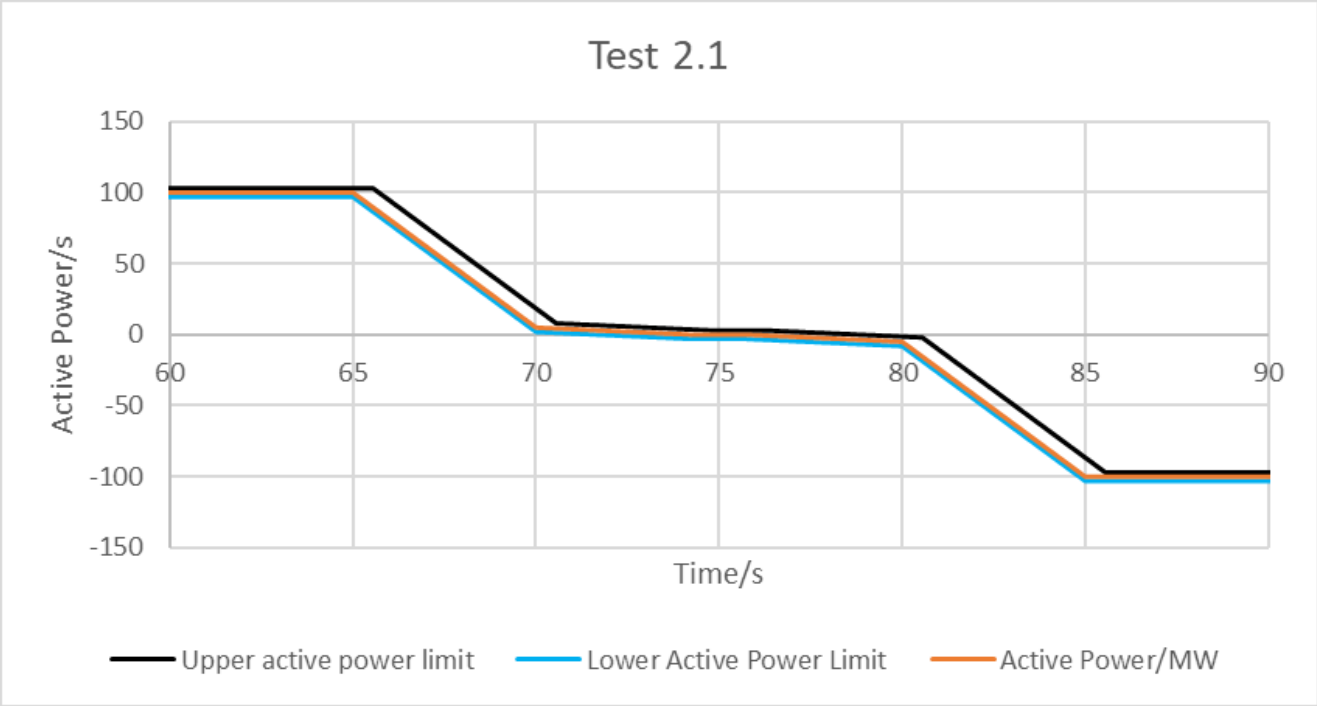


Figure 17 - Test 2.2 Tolerance

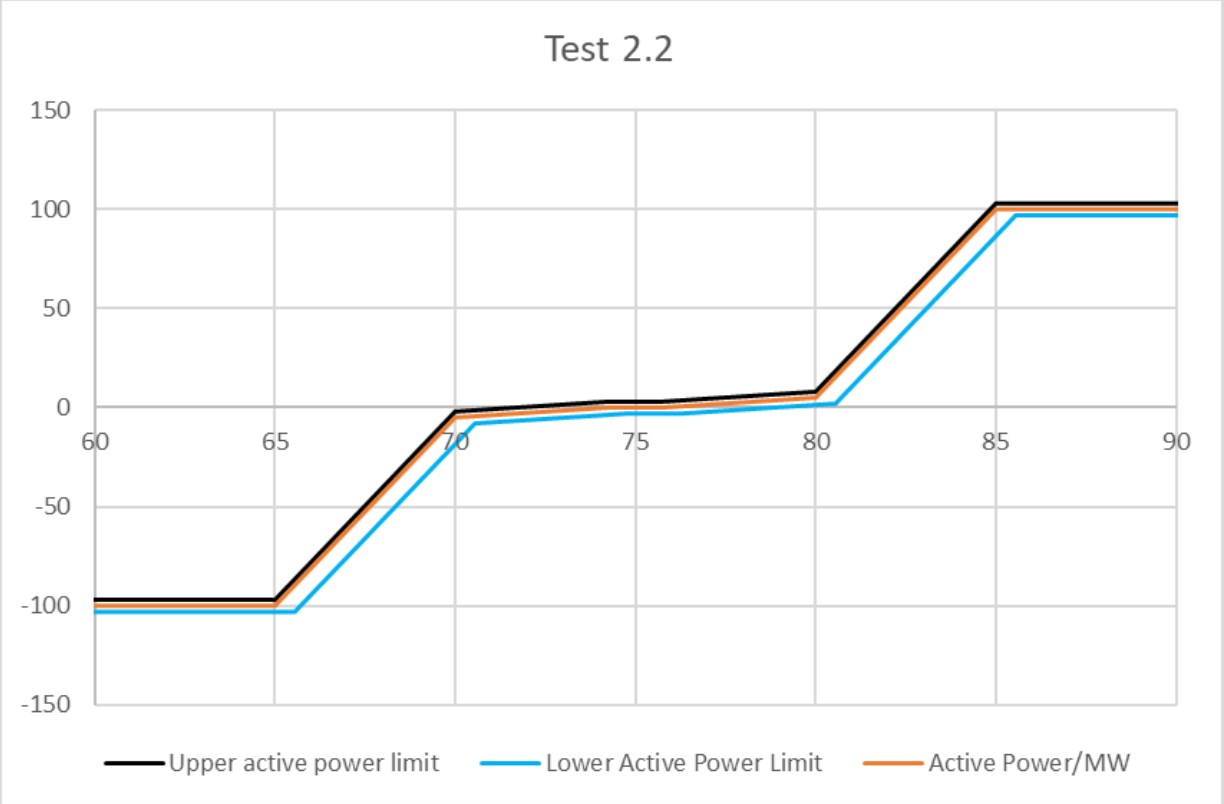


Table 12 - Test 2.1 and 2.2 Sweep Test tolerances (Without time delay to reach required delivery included)

	Test 2.1 and Test 2.2	
Frequency (Hz)	Expected Percentage Active Power Response (%)	Tolerance (% of Maximum Contracted)
50.3	100	±3%
50.2	100	± 3%
50.1	5	± 3%
50.0	0	0%
49.9	5	± 3%
49.8	100	± 3%
49.7	100	± 3%

Test 3 Duration Test

Test 3 assesses the ability of the **Plant** and **Apparatus** to sustain full response for 30 minutes.

- Operation will be tested at ±100% of capability to ensure the system is compliant.
- This is carried out by a frequency step of ±0.3Hz onto the system for 30 minutes.
- The frequency injection profiles are shown in Figure 18 and Figure *19* and Table *13* and Table *14* below

Please note that **Registered Response Participants** can reuse existing duration tests for an asset, providing that they are for the same duration or longer and have the same MW value.

Pass criteria for test 3:

- The standard deviation of load error at steady state over a 30-minute period must not exceed 2.5% of the maximum contracted active power.
- Sustain response for 30 minutes.

Figure 18 Test 3.1 Injection Profile

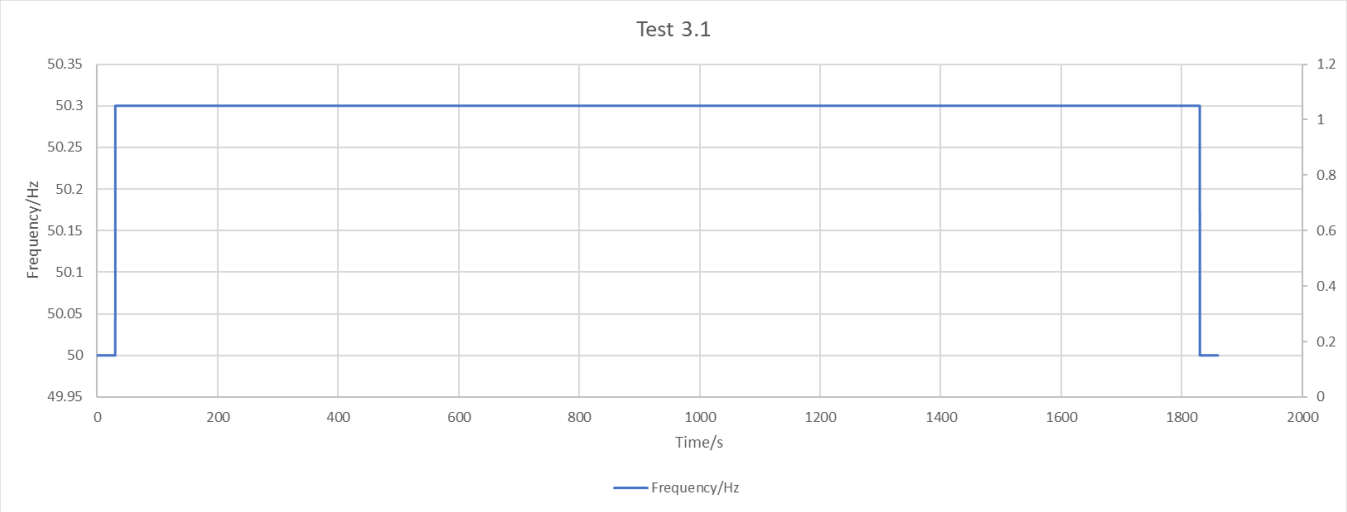


Figure 19 Test 3.2 Injection Profile

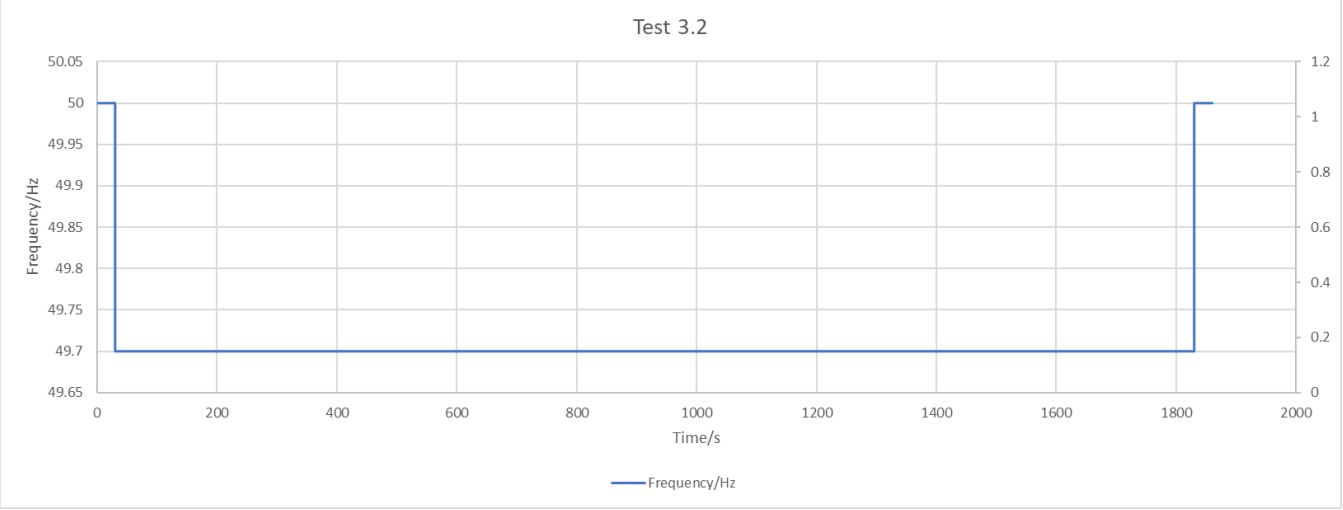


Table 13: Test 3.1 Frequency Injection Table Corresponding with times

	Test 3.1 Frequency injection table					
Time /s	0	30	30	1830	1830	1860
Frequency /Hz	50	50	50.3	50.3	50	50

Table 14: Test 3.2 Frequency Injection Table Corresponding with times

	Test 3.2 Frequency injection table					
Time /s	0	30	30	1830	1830	1860
Frequency /Hz	50	50	49.7	49.7	50	50

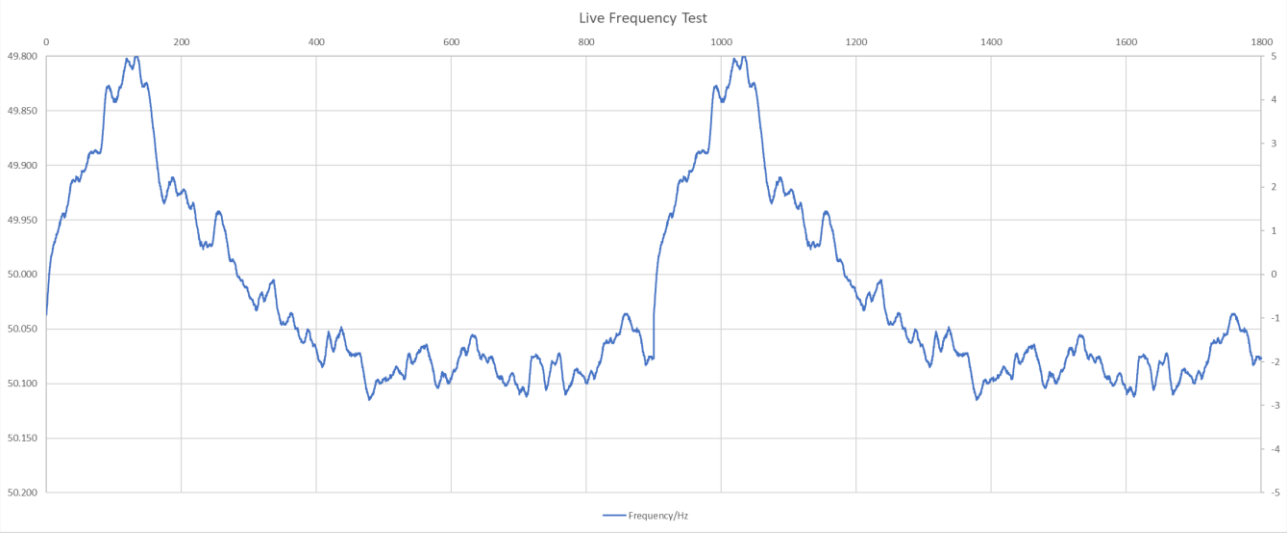
Test 4 – Live System Frequency Response Test

Test 4 assesses the response of the **Plant** and **Apparatus** to system frequency in a live environment. The minimum sample rate for this test is 20Hz and duration is 30 minutes where system frequency and active power response will be recorded. As part of test 4, **Registered Response Participants** are required to provide evidence that the protection settings are in line with the **Grid Code** (± of 5% of 50Hz).

Pass Criteria for Test 4

- Provide an active power response consistent with the contracted performance within timescales.
- Provide evidence protection setting comply with **Grid Code**.

Figure 20 - Sample System Frequency



Appendix A – Test Signals

The limits of error and minimum sample rates for testing are shown below in Table *8*. All success criteria are subject to the stated limit of error/accuracy threshold.

Table 15 - Limits of error and minimum sample rates for Dynamic Moderation Testing

	Limit of error/ Accuracy threshold	Minimum Sample rate Test 1	Minimum Sample rate Tests 2 and 3
Injection Frequency (Hz)	±0.01 Hz	20Hz	20Hz
Active Power (MW)	Please see pass criteria	20Hz	20Hz
	Limit of error/ Accuracy threshold	Minimum Sample rate Test 4	
Measured System Frequency (Hz)	±0.001 Hz	20Hz	
Active Power (MW)	Please see pass criteria	20Hz	

Simulations / simulated tests are not permitted. Each test submitted must record real time data from the plant and sites under test: The test data submitted must come from the specific site to be contracted; substituted data will not be accepted. Test results must not be changed before submission for analysis.

Test Signals

In ALL cases, the data should record ALL required signals for at least 30 seconds BEFORE the application of the frequency injection signal and for at least 30 seconds AFTER the completion of the test.

For ALL services, the data for the following signals will need to be provided

e) Time
f) Active Power
g) System Frequency or Injected frequency as appropriate
h) Any other relevant signals that may affect the success criteria such as Relay Logic for non-dynamic.

Appendix B - Dynamic Moderation Test Data Format

Figure 21 - Sample Dynamic Moderation Test Data Format

Provider	Company Name	
Date	xx-xx-xxxx	
Test	1	
Service	Dymanic Moderation	
Location	AA	
Site	AA	
Time/s	Injected Frequency/s	Measred Power/MW
0	50.00	0.00
0.05	50.00	0.00
0.1	50.00	0.00
0.15	50.00	0.00
0.2	50.00	0.00
0.25	50.30	5.00
0.3	50.30	5.00
0.35	50.30	5.00
0.4	50.30	5.00
0.45	50.30	5.00
0.5	50.30	5.00
0.55	50.30	5.00
0.6	50.00	0.00
0.65	50.00	0.00
0.7	50.00	0.00
0.75	50.00	0.00
0.8	50.00	0.00

- Frequency Injection should be to 2 decimal places
- Measured Power should be to 3 decimal places
- Measured frequency for test 4 should be to 3 decimal places

Further columns can be added to include data for several sites if required.

For Test 4 replace ‘Injected Frequency’ with ‘Measured Frequency’.

Appendix C – Dynamic Moderation Test Assessment

Excel Analysis Tool published with User Guide.

See Test certificate template in Appendix D for further guidance.

Appendix D – Dynamic Moderation Test Certificate Template

Please use this Test Certificate format and submit to NGESO, along with the test data and CV of the ITE employed by the prospective response provider.

Prospective Response Provider Company Details

Contracted company name	
Primary contact name	
Contact number/s	
Email address	

Contract Details

Contract ID	
Service type	
Asset type, e.g. battery	
Unit make up, e.g. single or aggregated	*Describe here what is included in this test e.g. Single asset, group of assets, asset/s being assessed within an existing Unit.*
Aggregation methodology (if appropriate)	
Unit location / ID	
Do any assets associated with this report have a condition in their DNO connection agreement whereby they are signed up to an Active Network management (ANM) Scheme / Flexibility Connection? If yes, please ensure contracted party speaks to their ESO account manager.	
Contract signed date	
Service start date	
Test date	

Dynamic Service Details (*example here is for a 5MW Unit*)

Deadband	±0.015Hz
Response / MW	5

Test Results

Further relevant test description/commentary here

Test	Pass Criteria	Pass/Fail	Comment
1.1, 1.2	No delivery within deadband. Where there are any non-zero values here these need to be explained by the ITE in the test report using the comments field.		
1.3,1.4	For Test 1.3 and 1.4 a noticeable change in active power in the correct direction is all that is required.		
1.5-1.8	Active power response within each 3 minute timescale remains within tolerances.	Pass	Note result here (See Figure …)
1.5-1.8	A response following a change of frequency should occur within 0.5 second.		
1.5-1.8	Delivery of active power due to a change in frequency is achieved in the required timescale	Pass	
1.5-1.8	The Unit should monotonically progress to its required response	Pass	
2.1 2.2	Active power response is within the allowed tolerances.	Pass	Show in figure below with tolerance bands overlaid.
3	Response is sustained for 30 minutes	Pass	Refer to figures
3	The standard deviation of load error at steady state over a 1800 second period must not exceed 2.5% of the maximum contracted active power.	Pass	Standard deviation is assessed from 1 second until 1800 seconds after the frequency step.
4	Provide an active power response consistent with the contracted performance timescales.		Figure should show the active power following frequency as expected.
	Overall Test Result		

Test Result Graphs

Plot frequency injection and active power response vs time for each test.

Figure 1 – Test 1 Active Power Response

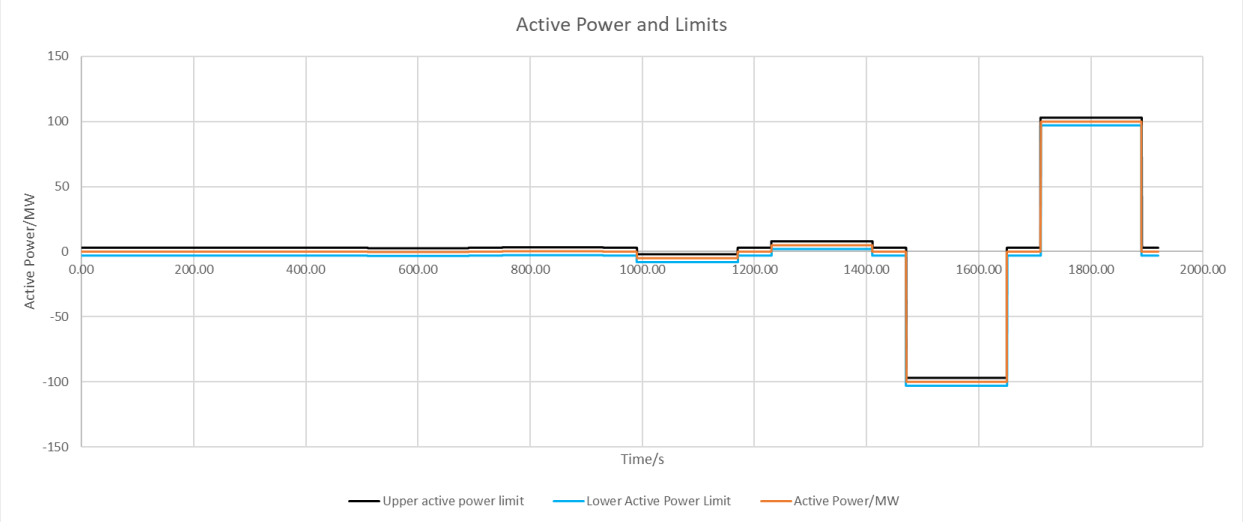


Figure 2 – Test 1.1

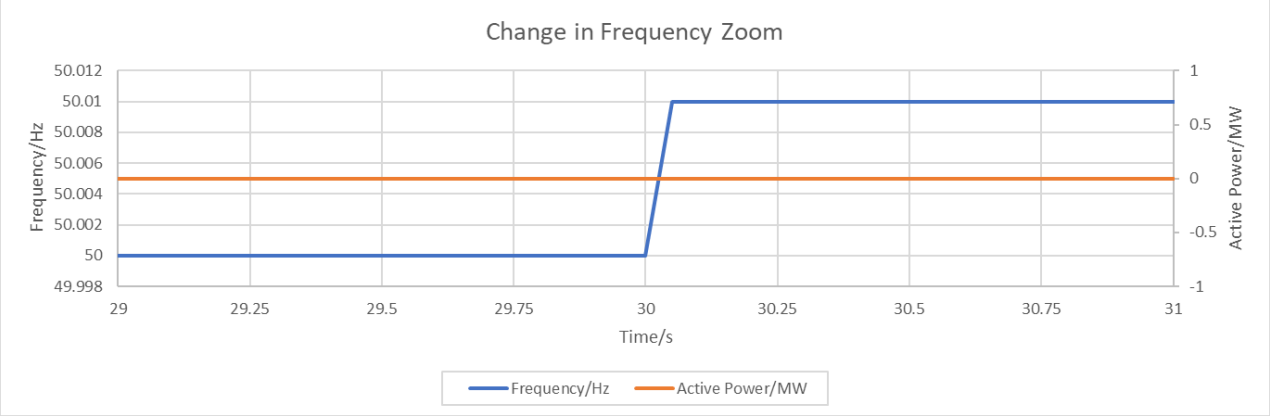


Figure 3 – Test 1.3

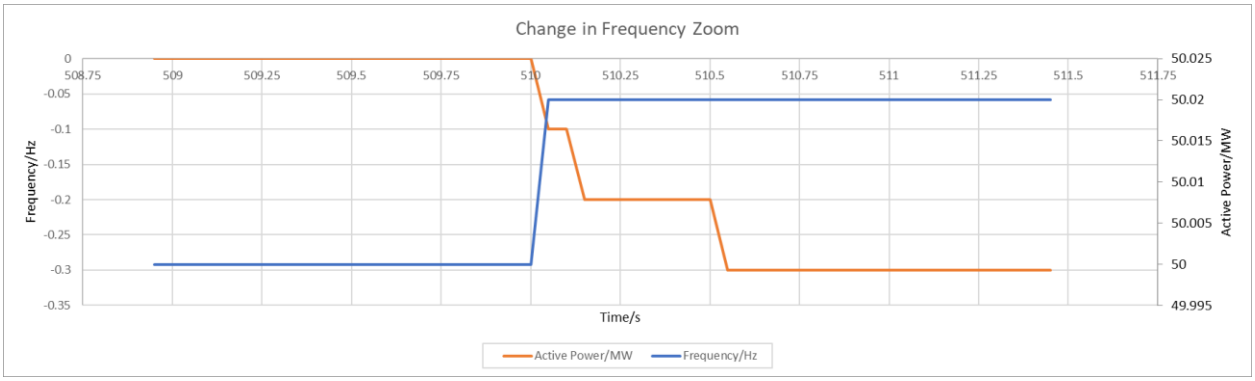


Figure 4 – Test 1.6

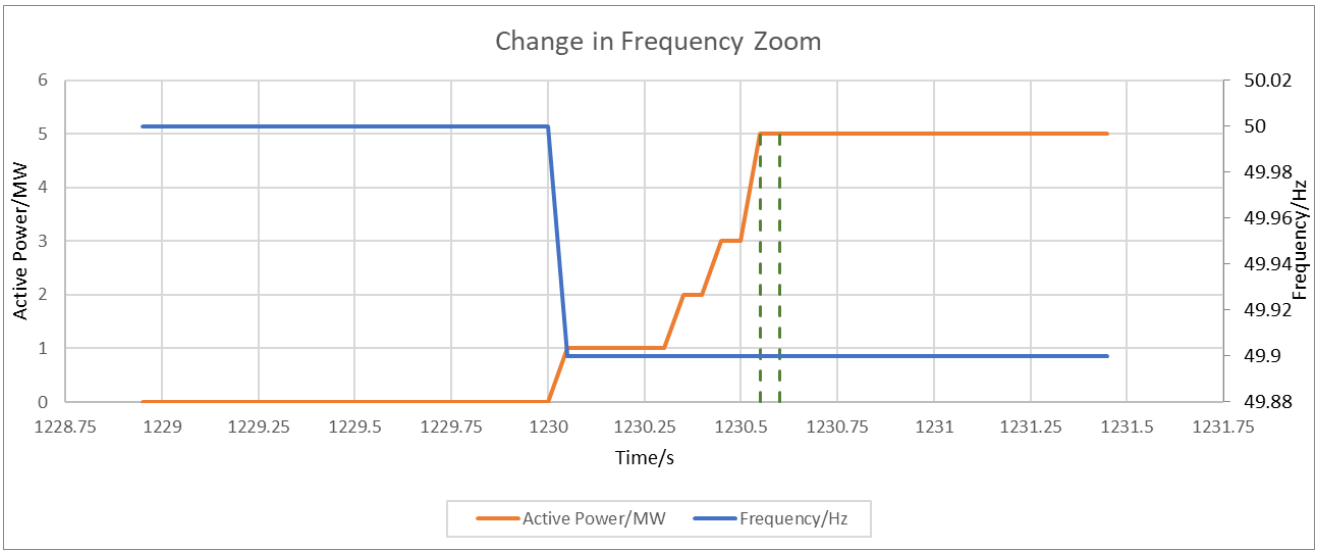


Figure 5 – Test 1.7

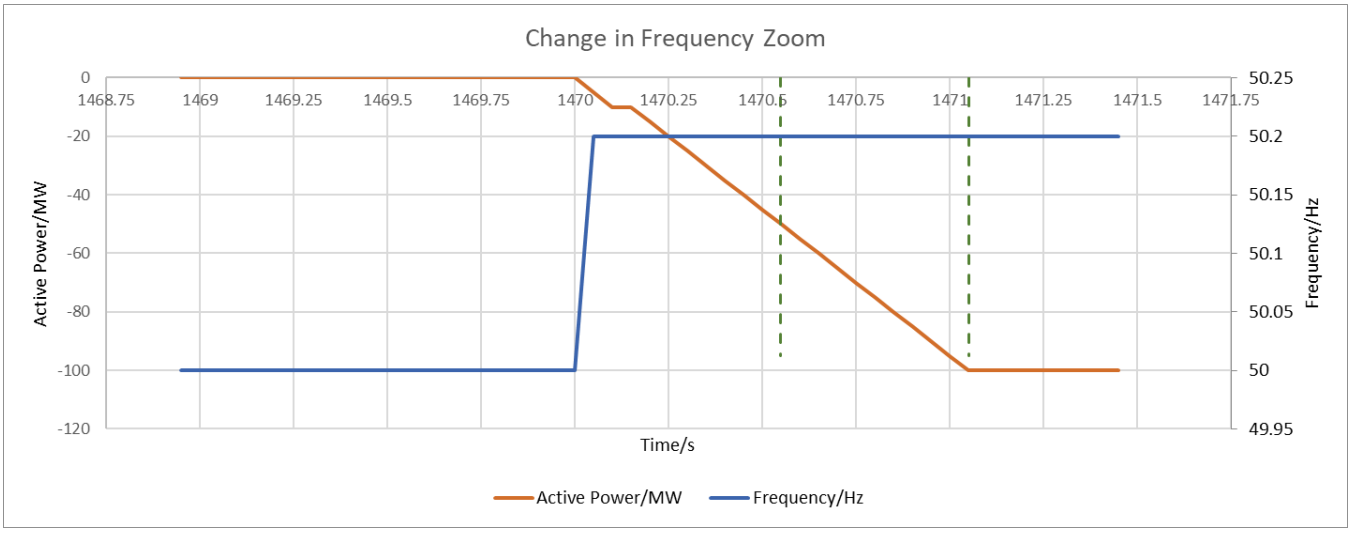


Figure 6 – Test 2.1

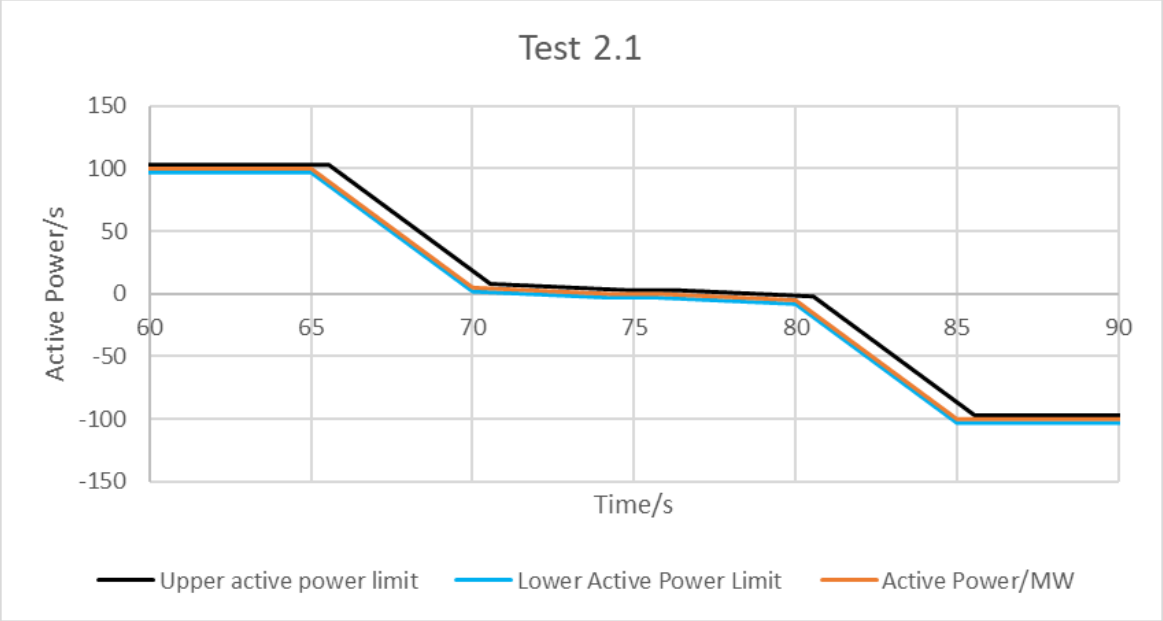


Figure 7 – Test 2.2

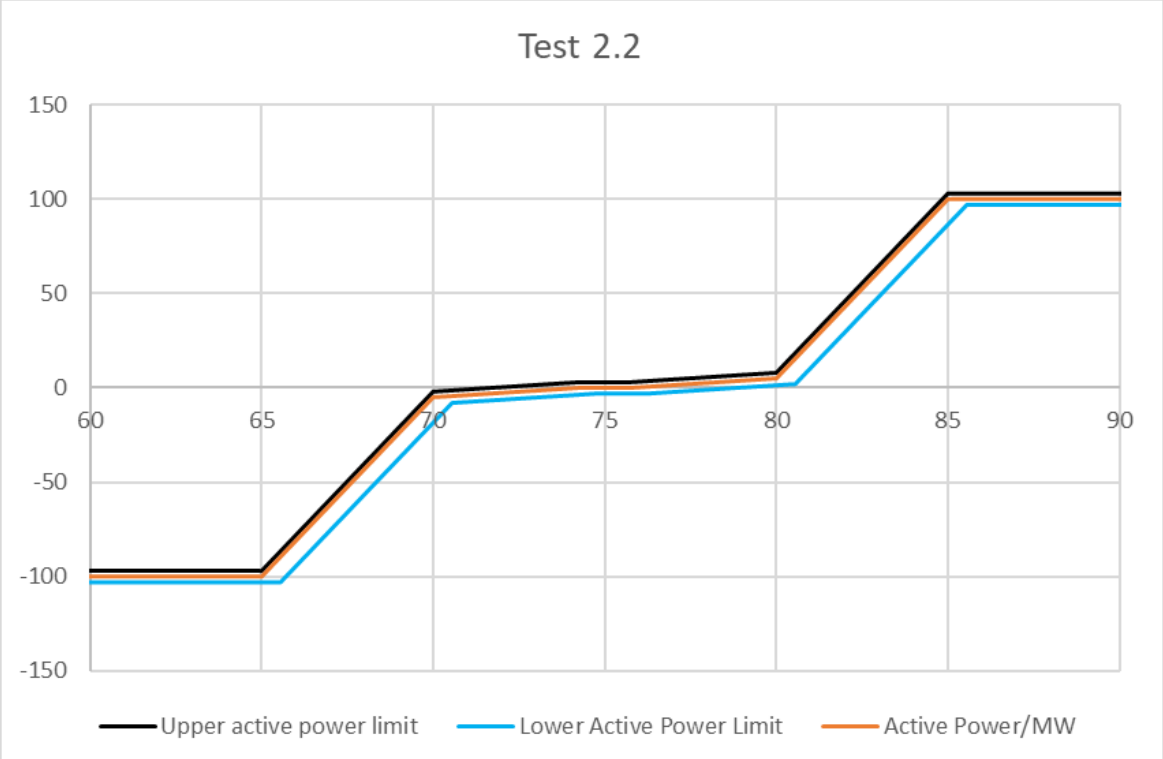


Figure 8 – Test 3.1

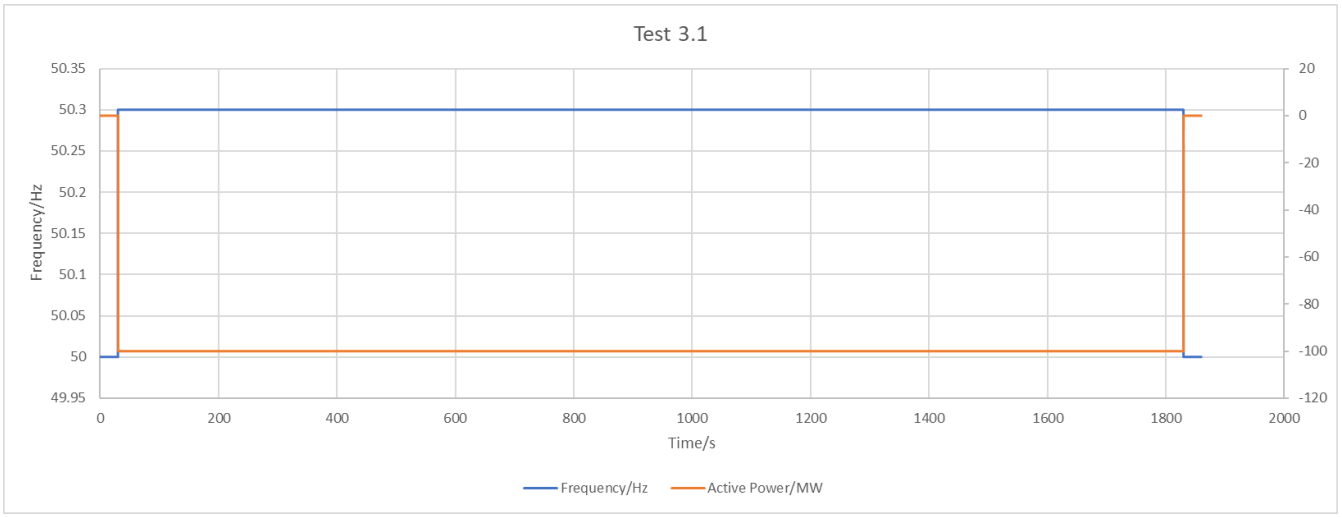


Figure 9 – Test 3.2

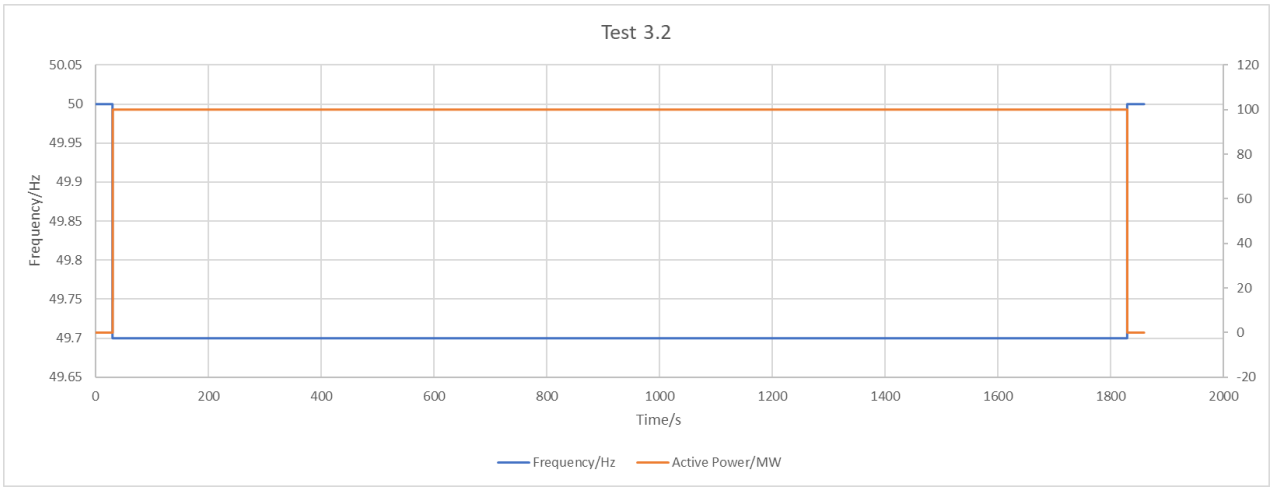
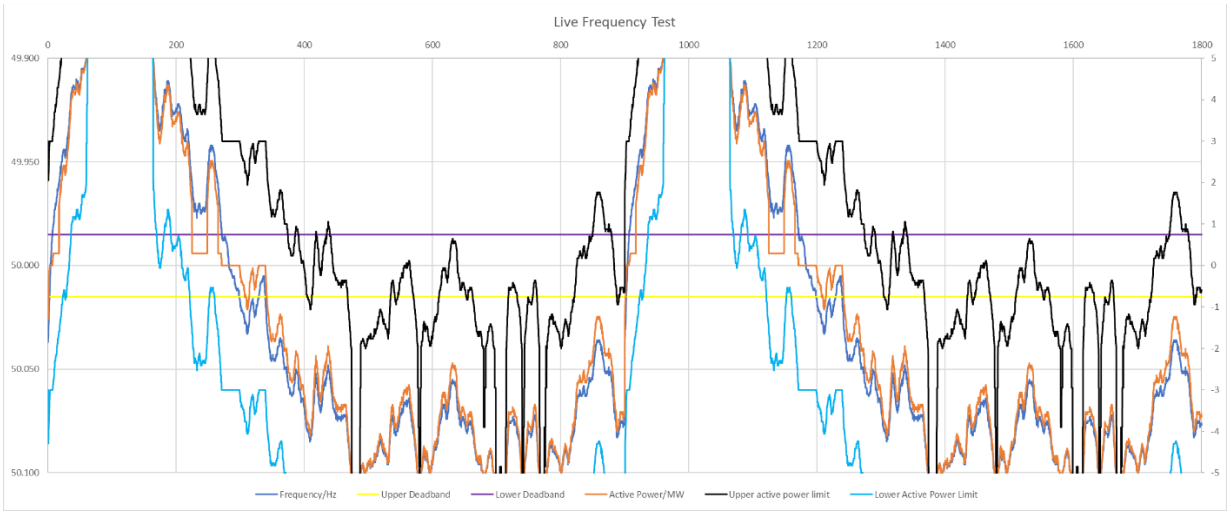


Figure 10 – Test 4



Independent Technical Expert (ITE) Details

Company name
Primary contact name
Contact number /s
Email address

I / We confirm that I / We the following:

(e) I/We am a/are Independent Technical Expert(s) (as defined in Schedule 4 of NGESO's prevailing Response Procurement Rules);

(f) I/We have carried out an assessment of the [asset] described above in accordance with the testing guidelines set out in the Response Procurement Rules;

(g) the above details are, to my/our best knowledge and belief, true, accurate, complete and not misleading; and

(h) the CV attached of my/our experience is to my/our best knowledge and belief, true, accurate, complete and not misleading.

Signed:

Date:

Part 3 - Dynamic Regulation Test Requirements

The **Dynamic Regulation** tests assess the capability of the **Registered Response Participant** to deliver dynamic response in accordance with a **Response Contract**.

Tests 1 and 2 assess response against injected frequency profiles. Test 3 assesses response whilst connected to live system frequency. The frequency profile can be injected either at site or remotely. The minimum sample rate for Test 1 is 10Hz and for Tests 2 and 3 2Hz. See Appendix A for information on test signals.

Aggregation/Test Approach

These tests are designed to meet the **NGESO** requirement for service validation as well as being equally suitable for all types of **Plant** and **Apparatus** (both single-site or multi-site) and technology types (generation, storage, demand or a combination of same). The tests also consider how providers adding to and evolving their aggregated portfolios over time can have additional assets validated.

The three dynamic tests can assess the capability of

- A single asset
- A group of assets
- Asset/s to be added to an existing aggregated facility

Test 1 – Duration Test

The two tests described here can be carried out at the individual or group of assets level. These tests confirm the volume of response the **Plant** and **Apparatus** can deliver, and both demonstrate response within the requisite timescales as well as provision of delivery of the **Plant** and **Apparatus** for required period of the service. The sum of the demonstrated outer-envelope responses for each tested **Eligible Asset** in a **Response Unit** (being the aggregated **Registered Quantities**) constitutes (after rounding) the maximum possible **Contracted Quantity** for the **Response Unit**.

The data can be presented with the new tested volume (presented site by site) aggregated by itself, or where adding volume to an existing **Plant** and **Apparatus**, aggregated with the step test data from that existing pre-tested **Plant** and **Apparatus**.

The minimum sample rate for Tests 1.1 and 1.2 is 10Hz.

The frequency injections to be used are shown in **Table 2**, **Figure 2** and **Figure 3** below.

Table 2 - Test 1 Frequency Injection Profile

Time (s)	Injected Frequency (Hz)	
	Test 1.1	Test 1.2
0	50	50
30	50	50
30	49.8	50.2
3630	49.8	50.2
3630	50	50
3660	50	50

Figure 2 - Test 1.1

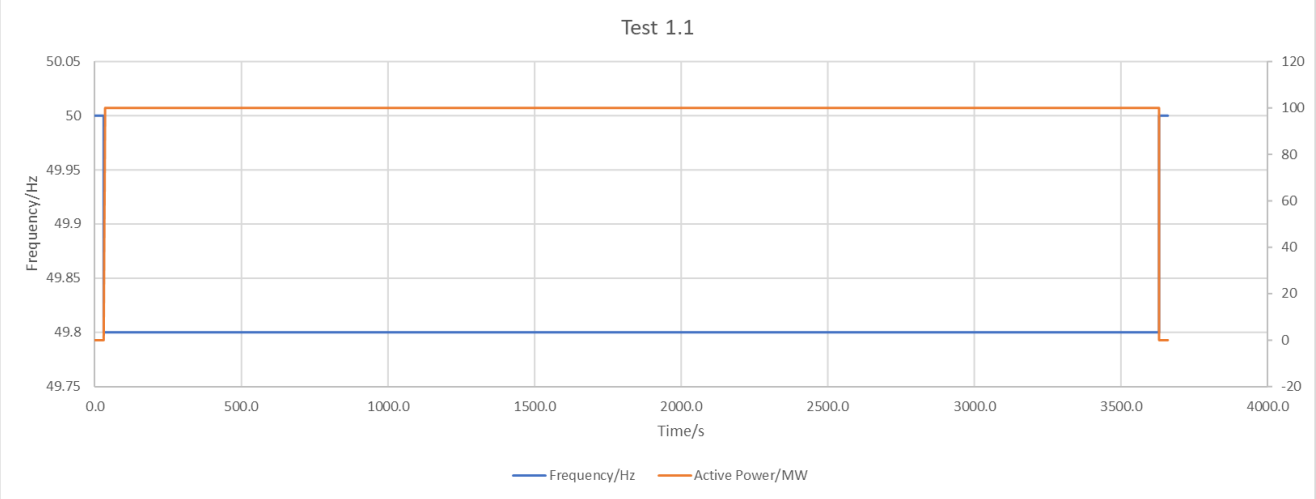
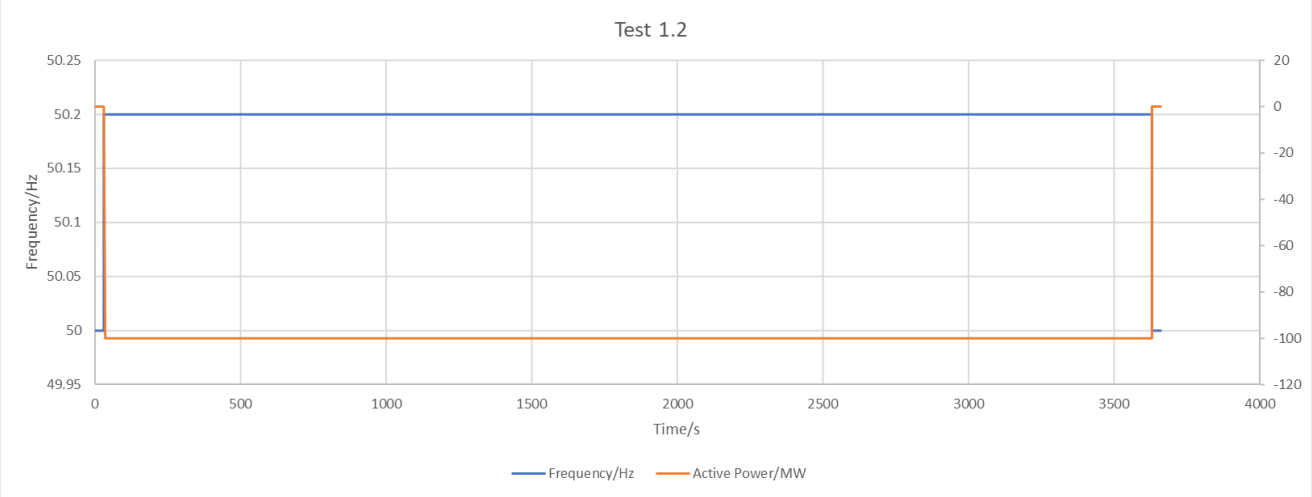


Figure 3 - Test 1.2



Assessment Criteria for Test 1

Single Asset which will be assessed as part of an aggregated facility

- Record the minimum response achieved within the 10 second to 60 minute timescale.
- How long is the response sustained? (In some cases this may be less than 60 minutes for a single asset which is part of an aggregated asset).

Pass criteria for Unit level (single asset or aggregation)

- The sum of minimum response achieved within the 10 second to 60 minute timescale constitute the total volume of the **Response Unit**. (i.e. the minimum total response achieved within each timescale).
- Delay in response of active power due to a change in frequency is no greater than 2 seconds.
- The **Plant** and **Apparatus** should monotonically progress to its maximum response.

- The standard deviation of load error at steady state over a 60 minute period must not exceed 2.5% of the maximum contracted active power response (standard deviation is assessed from 10 seconds until 60 minutes after the frequency step).
- Sustain response for 60 minutes.
- Please note that **Registered Response Participants** can reuse existing duration tests for an asset, providing that they are for the same duration or longer and have the same MW value.

Test 2 – Response Tests

This test assesses the capability to deliver the following:

- No response inside the deadband
- Response just outside the deadband
- Proportional response at discreet frequency levels
- Response to changing frequency varying over the entire performance envelope

The minimum sample rate is 2Hz for the response tests.

Aggregation/Test Approach

Test Scenario 1: Where a volume is being tested by itself for validation, the two response tests should be carried out on the asset/s to demonstrate the response of the asset/s for the full range of frequency.

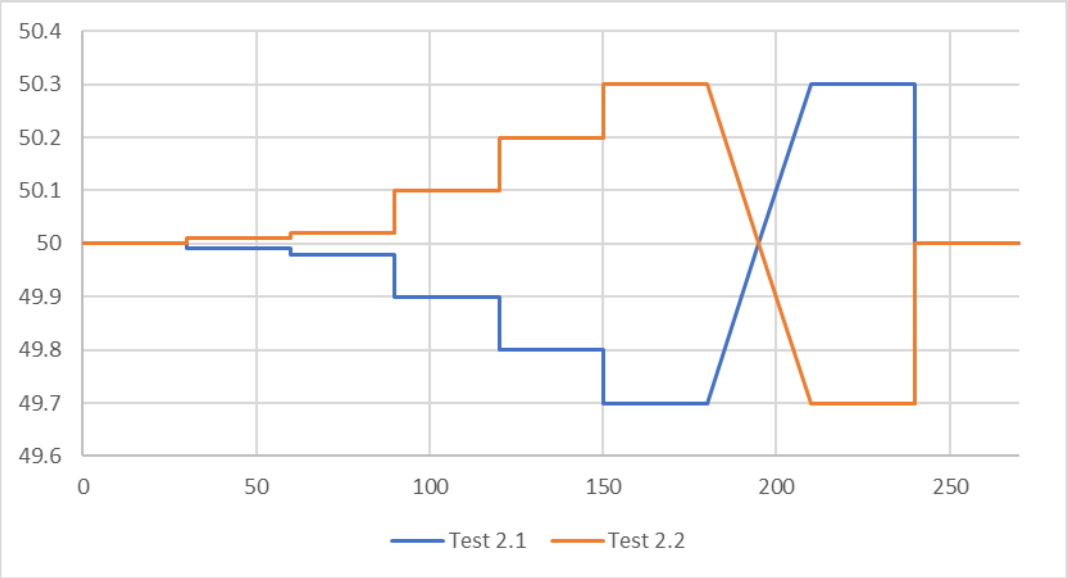
Test Scenario 2: Where a new “in-test” volume is being added to an existing (tested) volume (which it is dependent upon for compliance), the tests would be carried out within an existing aggregated asset that has been withdrawn from the market for the test period.

Table 3 - Test 2 Frequency Injection Profiles

Time (s)	Injected Frequency (Hz)		Sub-test reference for assessment
	Test 2.1	Test 2.2	
0	50	50	
30	50	50	
30	49.99	50.01	a
60	49.99	50.01	a
60	49.98	50.02	b
90	49.98	50.02	b
90	49.9	50.1	c
120	49.9	50.1	c
120	49.8	50.2	d
150	49.8	50.2	d
150	49.7	50.3	e
180	49.7	50.3	f
195	50	50	f

210	50.3	49.7	f
240	50.3	49.7	
240	50	50	
270	50	50	

Figure 4 - Test 2 Injection Profile



Pass Criteria for Tests 2.1 and 2.2

- For 2.1a and 2.2a the **Plant** and **Apparatus** should not provide any response within the deadband save that, as referred to in paragraph 6.11 vi of the **Response Service Terms**, a **Response Unit** which is not **Energy Limited** may deviate from its **Operational Baseline** whilst **System Frequency** is within such "deadband" to the extent it is providing equivalent **Mode A Frequency Response** up to the **Contracted Quantity**. Where there are any non-zero values here these need to be explained by the ITE in the test report using the comments field.

- Tests 2.1b and 2.2b a noticeable change in power in the correct direction is observed. This test ensures that the **Plant** and **Apparatus** will respond to small frequency deviations outside the deadband.

- For ±0.1Hz, ±0.2Hz and steps ±0.3Hz (Tests c, d and e) the response values achieved are proportional. Also ±0.3Hz sections should reflect total maximum volume from Test 1. For each 30 second step the minimum response from 10-30 seconds should be assessed against the contracted delivery volume.

- For Test 2.1f and 2.2f, active power response is within the tolerances in Table 4 (Figure 5 and Figure 6). (Performance monitoring criteria used to calculate tolerance bands).

Table 4 - Test 2 Tolerances (Without time delay to reach required delivery included)

Frequency Deviation (Hz)	Expected Response (Percentage of maximum)	Tolerance (Percentage of Maximum Contracted)
0.01	n/a	n/a
0.02	*	*
0.1	~50**	± 5%
0.2	100	± 5%
0.3	100	± 5%

**At 0.1% the actual expected response is 45.9459% due to linear delivery between 0.015Hz (deadband) to 0.2Hz

Figure 5 - Test 2.1 Tolerance

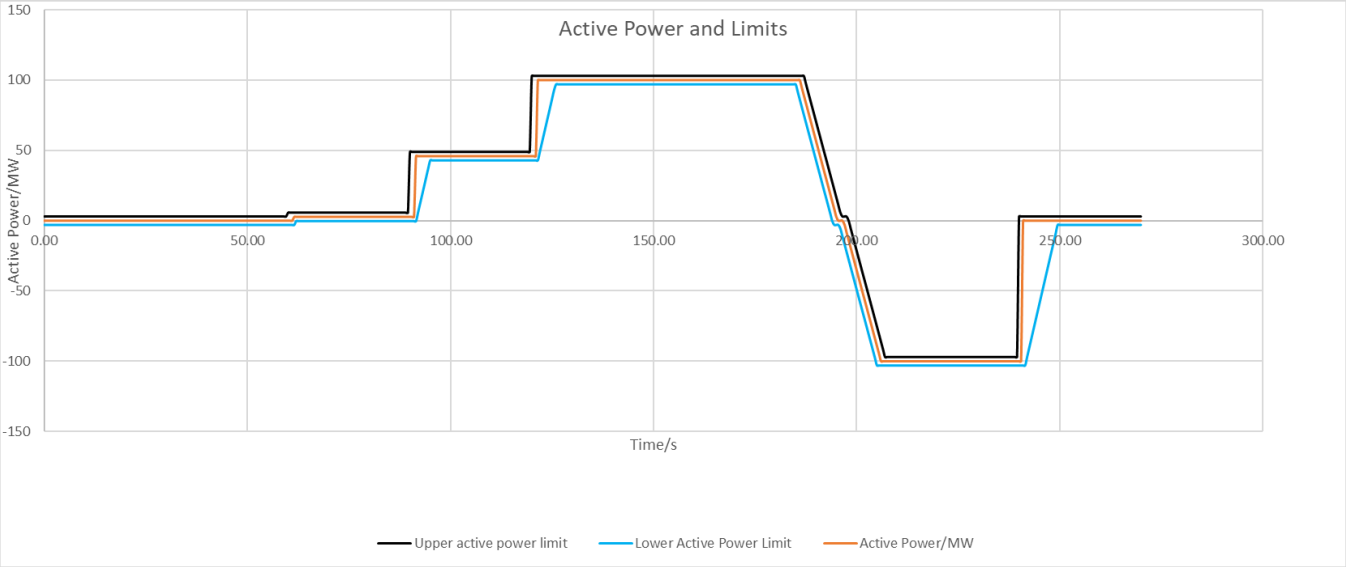
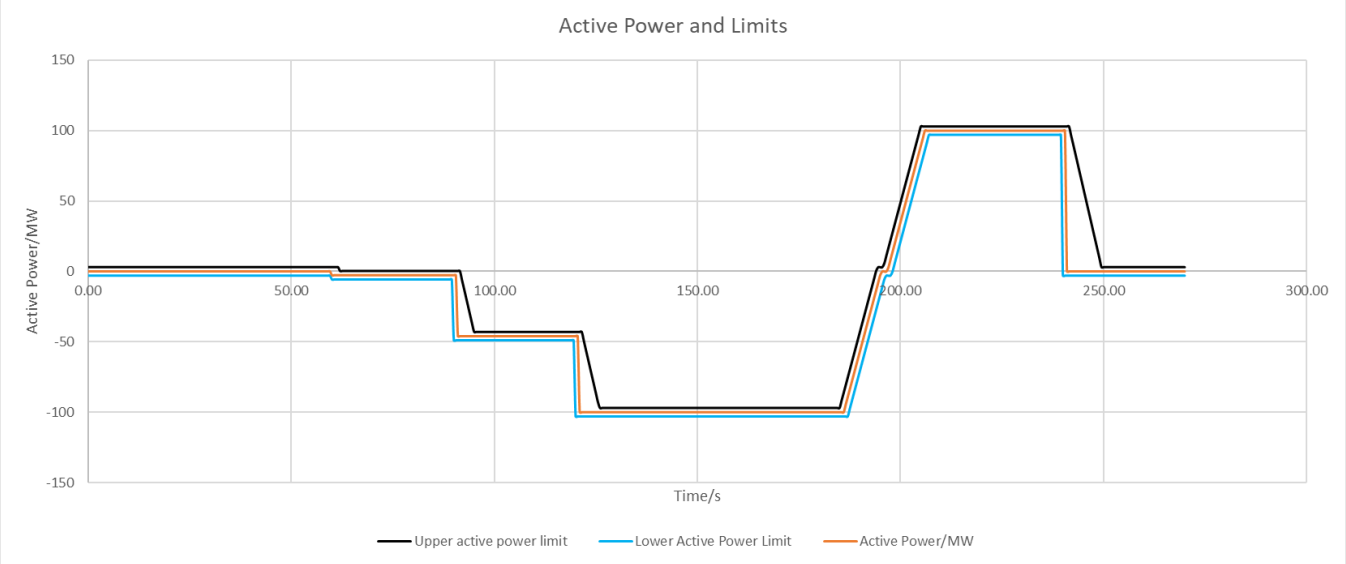


Figure 6 - Test 2.2 Tolerance



Test 3 – Live System Frequency Response Test

Test 3 assesses the response of the **Plant** and **Apparatus** to system frequency in a live environment. The minimum sample rate for this test is minimum 2Hz and duration is 1 hour where

system frequency and active power response will be recorded. As part of test 3, you are required to provide evidence that the protection settings are in line with the Grid Code (± of 5% of 50Hz).

Aggregation

The options for the live test are as follows.

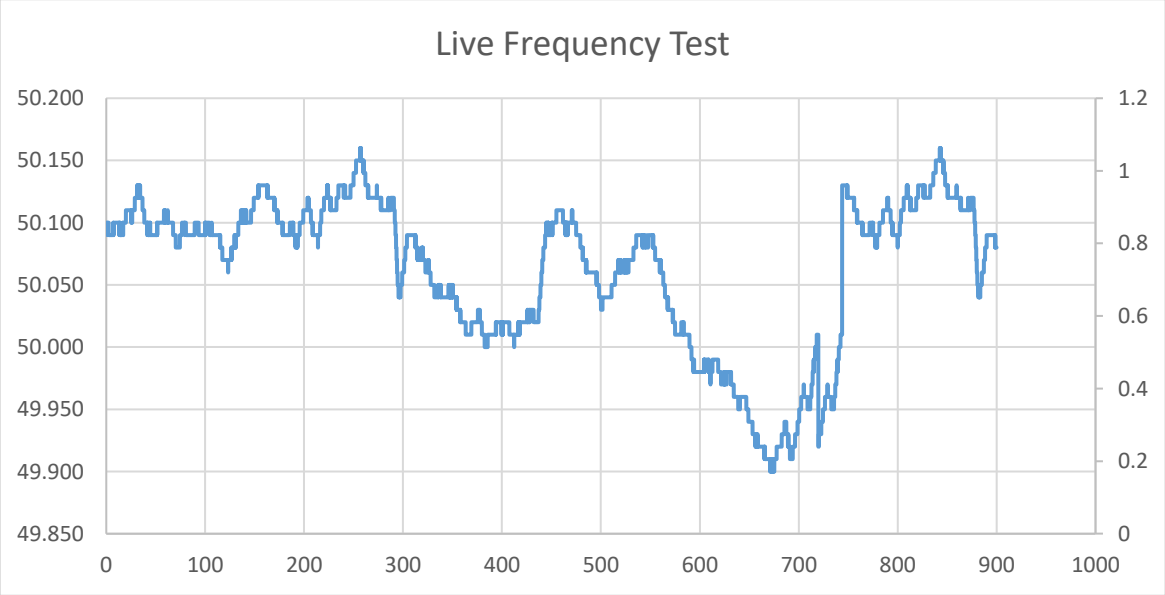
1. A single asset capable of meeting the DR service specification on its own.
2. A group of 'new' assets capable of meeting the DR service specification can be tested simultaneously. These could then contract as a standalone Response Unit or be added to an existing Response Unit.
3. New asset/s to be added to an existing Response Unit can carry out a live test where the new "in-test" assets would be added to the existing Response Unit and run following the system frequency (equivalent of being in-market) for a period of 1 hour. (See Appendix E for further details).

Pass Criteria for Test 3

- Provide an active power response consistent with the contracted performance within timescales.

- Provide evidence protection settings comply with Grid Code.

Figure 7 - Sample System Frequency



Appendix A – Test Signals

The limits of error and minimum sample rates for testing are shown below in **Table 5**. All success criteria are subject to the stated limit of error/accuracy threshold.

Table 5 - Limits of error and minimum sample rates for Dynamic Regulation Testing

	Limit of error/ Accuracy threshold	Minimum Sample rate Test 1	Minimum Sample rate Tests 2 and 3
Injection Frequency (Hz)	±0.01 Hz	10Hz	2Hz
Active Power (MW)	Please see pass criteria	10Hz	2Hz

Simulations / simulated tests are not permitted. Each test submitted must record real time data from the plant and sites under test: The test data submitted must come from the specific site to be contracted; substituted data will not be accepted. Test results must not be changed before submission for analysis.

Test Signals

In ALL cases, the data should record ALL required signals for at least 30 seconds BEFORE the application of the frequency injection signal and for at least 30 seconds AFTER the completion of the test.

For ALL services, the data for the following signals will need to be provided

i) Time
j) Active Power
k) System Frequency or Injected frequency as appropriate
l) Any other relevant signals that may affect the success criteria such as Relay Logic for non-dynamic.

Appendix B - Dynamic Regulation Test Data Format

Table 6 - Sample Dynamic Regulation Test Data Format

Time/s	Injected Frequency/s	Measred Power/MW
0.0	50.00	0.00
0.5	50.00	0.00
1.0	50.00	0.00
1.5	50.00	0.00
2.0	50.00	0.00
2.5	50.30	5.00
3.0	50.30	5.00
3.5	50.30	5.00
4.0	50.30	5.00
4.5	50.30	5.00
5.0	50.30	5.00
5.5	50.30	5.00
6.0	50.00	0.00
6.5	50.00	0.00
7.0	50.00	0.00
7.5	50.00	0.00
8.0	50.00	0.00

- Frequency Injection should be to 2 decimal places
- Measured Power should be to 3 decimal places
- Measured frequency for test 3 should be to 3 decimal places

Further columns can be added to include data for several sites if required.

For Test 3 replace ‘Injected Frequency’ with ‘Measured Frequency’.

Appendix C – Dynamic Regulation Test Assessment

Excel Analysis Tool published with User Guide.

See Test certificate template in Appendix D for further guidance.

Appendix D – Dynamic Regulation Test Certificate Template

Please use this Test Certificate format and submit to NGESO, along with the test data and CV of the ITE employed by the prospective response provider.

Prospective Response Provider Company Details

Contracted company name	
Primary contact name	
Contact number/s	
Email address	

Contract Details

Contract ID	
Service type	
Asset type, e.g. battery	
Unit make up, e.g. single or aggregated	*Describe here what is included in this test e.g. Single asset, group of assets, asset/s being assessed within an existing Unit.*
Aggregation methodology (if appropriate)	
Unit location / ID	
Do any assets associated with this report have a condition in their DNO connection agreement whereby they are signed up to an Active Network management (ANM) Scheme / Flexibility Connection? If yes, please ensure contracted party speaks to their ESO account manager.	
Contract signed date	
Service start date	
Test date	

Dynamic Service Details (*example here is for a 5MW Unit*)

Deadband	±0.015Hz
Response / MW	5

Test Results

Further relevant test description/commentary here

Test	Pass Criteria	Pass/Fail	Comment
Single Asset which will be assessed as part of an aggregated facility			
1	Record the minimum response achieved within the 10second to 30minute timescale.	N/A	Note result here (See Figure …)
1	Record how long is the response sustained	N/A	Note result here. (Some assets which are part of an aggregated unit may not be able to maintain response for 30 minutes.)
Pass criteria for Unit level (single asset or aggregation)			
1	Delay in response of active power due to a change in frequency is no greater than 2 seconds.	Pass	a response was observed within 2 seconds of the frequency change. This is illustrated in Figure …
1	Record the minimum response achieved within the 10second to 30minute timescale.	Pass	Record result here. Should align with the in-test volume in Table 1.
1	The Unit should monotonically progress to its maximum response.	Pass	Refer to Figures below.
1	The standard deviation of load error at steady state over a 60 minute period must not exceed 2.5% of the maximum contracted active power response.	Pass	Standard deviation is assessed from 10 seconds until 60 minutes after the frequency step.
1	Sustain response for 60 minutes.	Pass	
2.1a 2.2a	No response within the deadband	Pass	
2.1b 2.2b	A noticeable change in power in the correct direction is observed.		
2.1,2.2 c,d,e	For ±0.1Hz, ±0.2Hz and steps ±0.3Hz (Tests c, d and e) the response values achieved are proportional.	Pass	
2.1c-f 2.2c-f	Active power response is within the allowed tolerances.	Pass	Show in figure below with tolerance bands overlaid.
3	Provide an active power response consistent with the contracted performance timescales.	Pass	
	Overall Test Result	**PASS**	

Test Result Graphs

Plot frequency injection and active power response vs time for each test.

Figure 1 – Test 1.1

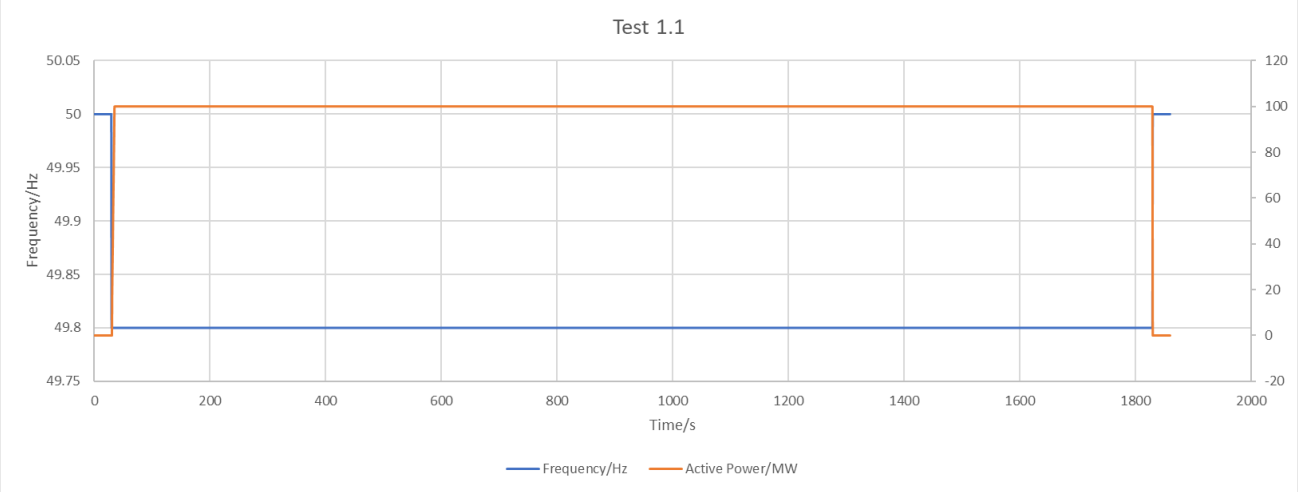


Figure 2 – Test 1.1 Change in Frequency Zoom

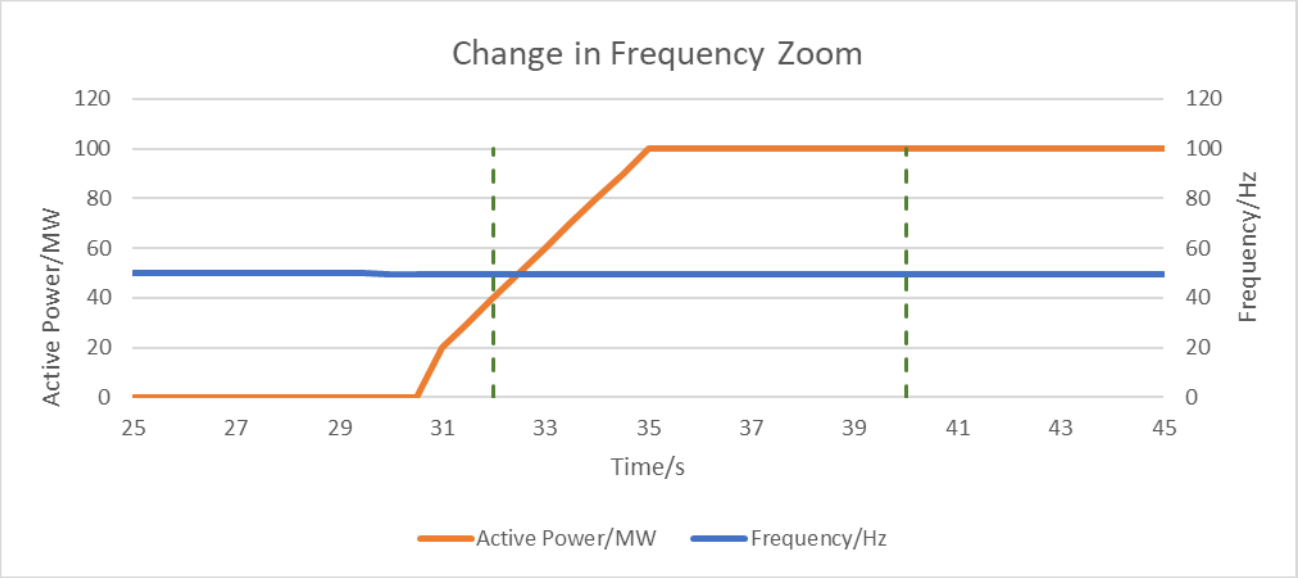


Figure 3 – Test 1.2

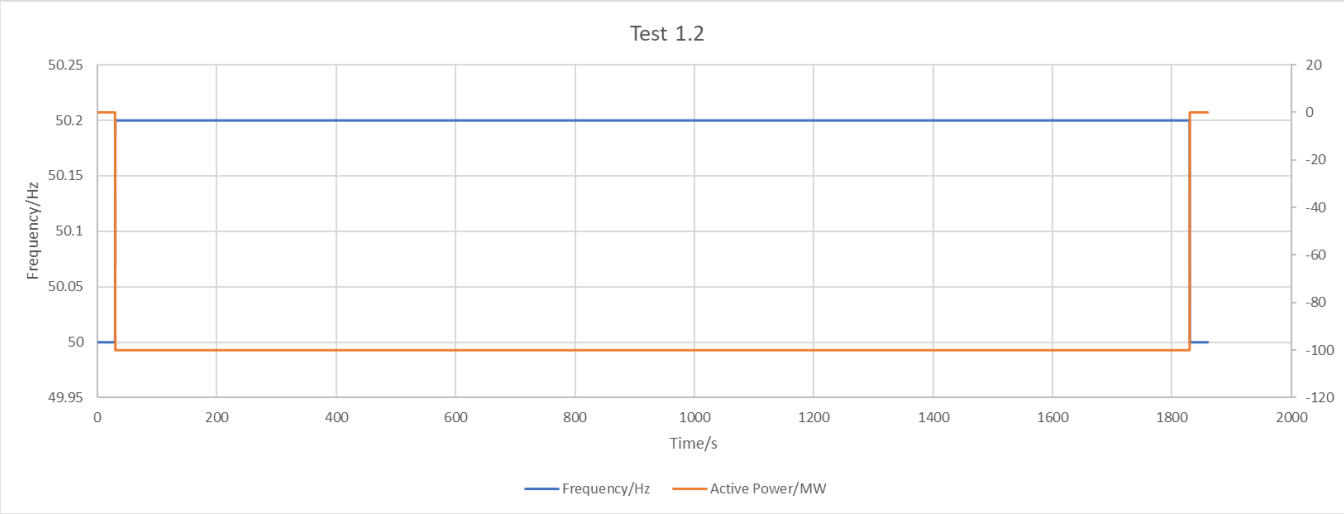


Figure 4 – Test 2.1

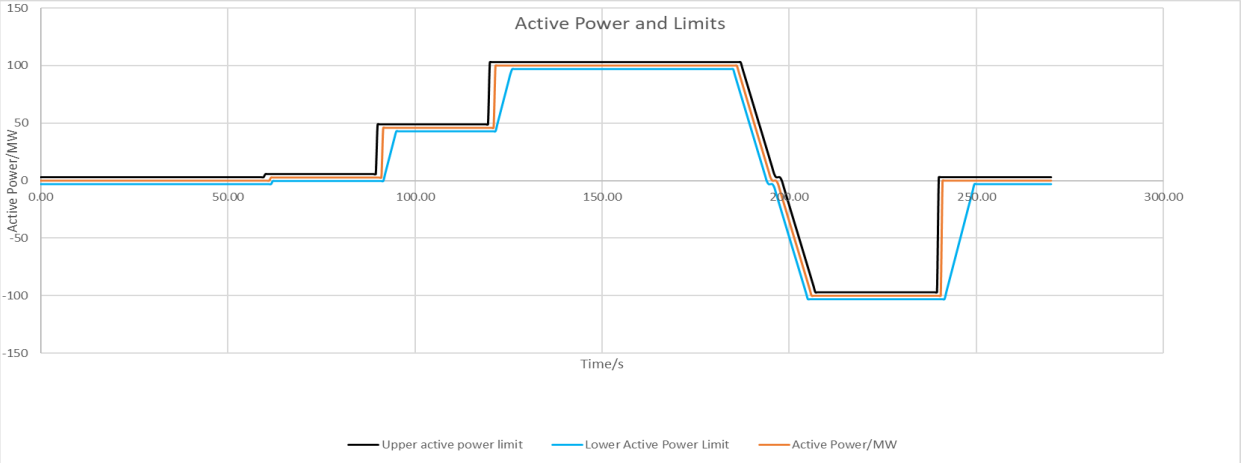


Figure 5 – Test 2.2

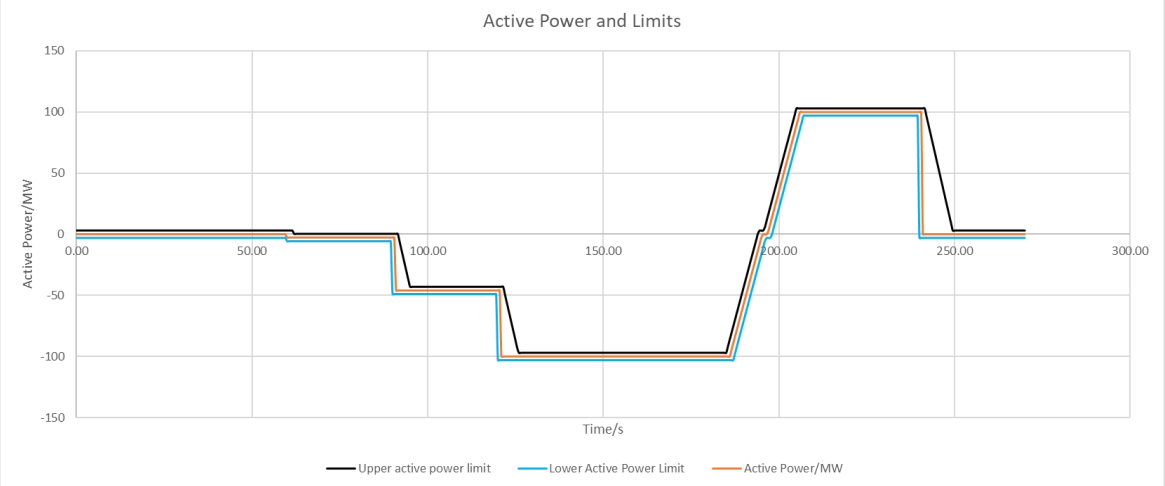
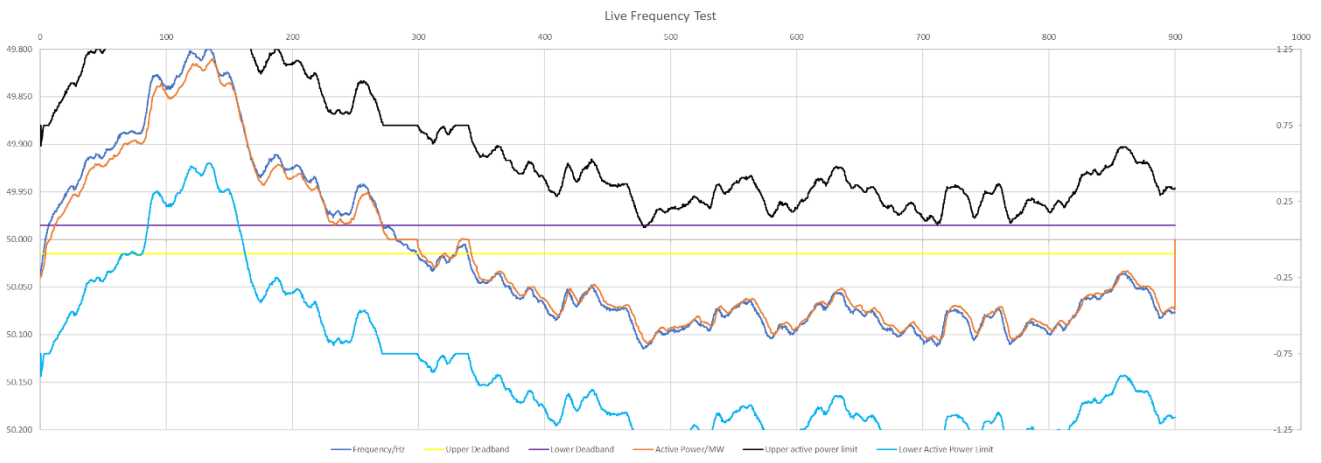


Figure 6 – Test 4



Independent Technical Expert (ITE) Details

Company name
Primary contact name
Contact number /s
Email address
I / We confirm that I / We the following: **(a) I/We am a/are Independent Technical Expert(s) (as defined in Appendix A of the NGESO's prevailing Testing Guidelines);** **(b) I/We have carried out an assessment of the [asset] described above in accordance with the testing guidelines set out in the Testing Guidelines;** **(c) the above details are, to my/our best knowledge and belief, true, accurate, complete and not misleading; and** **(d) the CV attached of my/our experience is to my/our best knowledge and belief, true, accurate, complete and not misleading.**
Signed: Date:

Appendix E - Test 3 Approach

The options for the live test are as follows.

1. A single asset capable of meeting DR criteria on its own. The single asset would be run following the system frequency (equivalent of being in-market) for a period of 1 hour
2. A group of 'new' assets capable of meeting DR criteria can be tested simultaneously. The 'new' assets would be aggregated and run following the system frequency (equivalent of being in-market) for a period of 1 hour. This would validate that the volume responds as required to system frequency in a live environment. This group of assets could then contract as a standalone unit or be added to an existing DR Unit.
3. New asset/s to be added to an existing DR Unit can carry out a live test where the new "in-test" assets would be added to the existing DR Unit and run following the system frequency (equivalent of being in-market) for a period of 1 hour. Where the new "in test" assets were being added to a DR Unit already in market, then they should be combined and aggregated with the live "in-market" unit to show the overall portfolio operating as required based on the "in-market" and "in-test" combined volume. The existing portfolio does not need to be withdrawn from market during this test but NGESO should be informed.

The test approach, described in option 3 above, would be carried out for an agreed 1-hour period with NGESO. This agreement will detail what assets are being added to the portfolio and the expected resulting change from its standard operation. For example, if six assets adding up to a 2MW total were added to a 10MW portfolio, the portfolio would usually be expected to behave like a 12MW portfolio. This validates that the combined volume responds as required against the system frequency in a live environment.

Data submission for this test shall include the frequency, response of the existing portfolio, response of each new asset in the new combined portfolio, and the combined total response of the portfolio.

If testing for Option 3, above, the frequency data and combined "in-test" and "in-market" volume response data would be submitted for validation

Schedule 4 – Independent Technical Expert: Definitions

Test results for all **Response Services** will be assessed by an **Independent Technical Expert** (ITE) who will prepare a **Test Certificate.**

The following definitions shall apply:

Group means, for any person, another person who is the direct or indirect **Holding Company** of that person and any **Subsidiary** of that **Holding Company**.

Holding Company means, in relation to a company, any other company in respect of which it is a **Subsidiary**.

Independent Technical Expert means an experienced technical expert with expertise in the operation of demand side response (DSR) or generating units or electricity Interconnectors (as the case may be), **Independent** of the prospective response provider, engaged by the prospective response provider at its expense to carry out a technical assessment and prepare a **Test Certificate.**

Independent means, for any technical expert and the applicable prospective response provider, that the technical expert is:

(a) not in the same **Group** as the prospective response provider; and
(b) neither engaged on terms, nor party to any other arrangements, which could allow the prospective response provider or any member of its **Group** to exercise undue influence on any assessment of the **Test Certificate** prepared by that technical expert or otherwise compromise the objectivity of any such assessment and test certificate to the **Required Technical Standard**.

Required Technical Standard means, with respect to any assessment and **Test Certificate** prepared by an **Independent Technical Expert** that:

(a) to the best of the **Independent Technical Expert**'s knowledge and belief all information provided in it is accurate, complete and not misleading; and
(b) any opinions or forecasts in the assessment have been conservatively prepared on assumptions which it considers to be fair and reasonable.

Subsidiary means a subsidiary within the meaning of section 1159 of the Companies Act 2006 (but relation to an Interconnector, or shareholder in such provider, subsection (1)(a) of that section shall apply as if a "majority of the voting rights" included 50% only of those rights)

Test Certificate means a certificate in the relevant form set out in Schedule 3 prepared by an **Independent Technical Expert**.