Dynamic Regulation Testing Analysis Tool

User guide v1.0

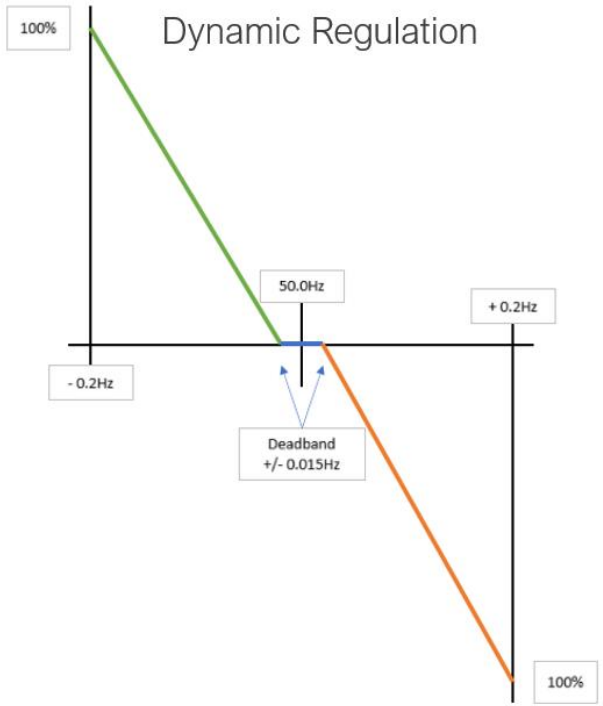
Date: 10/12/2021

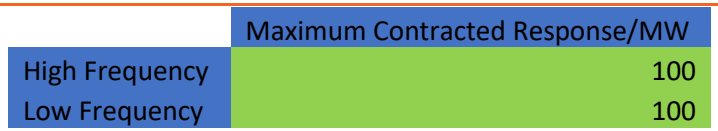
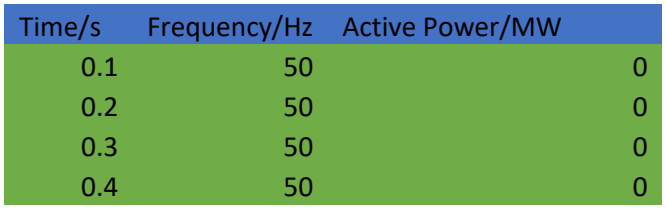
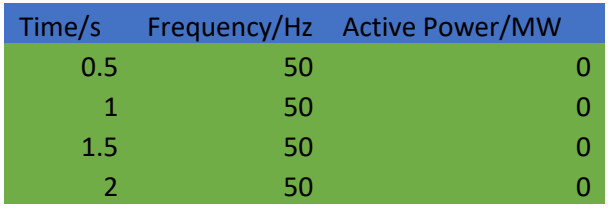
Introduction

This user guide describes how to use the ‘Dynamic Regulation Testing Analysis Tool’ to assess pre-qualification test results as specified in the Testing Guidelines for providers wishing to enter into a contract to provide Dynamic Regulation Frequency Response. The following sections are included:

- Prepare Test Data
- Populate Excel Analysis Tool
- Analyse Results against pass criteria
- Test Report

Step	Action	Description	Examples
Prepare Test Data			
1	Format test data to be pasted into Tool.	For Test 1.1 and 1.2, it is advised to use the tool with values of every 0.1s. For Test 2.1, 2.2 and Test 3, it is advised to use the tool with values of every 0.5s. The Tool has been designed to work for both low and high frequency and the sample tests show it working for both at the same time.	Time/s, Frequency/Hz, Active Power/MW 0, 50, 0 0.1, 50, 0 0.2, 50, 0 Time/s, Frequency/Hz, Active Power/MW 0, 50, 0 0.5, 50, 0 1, 50, 0

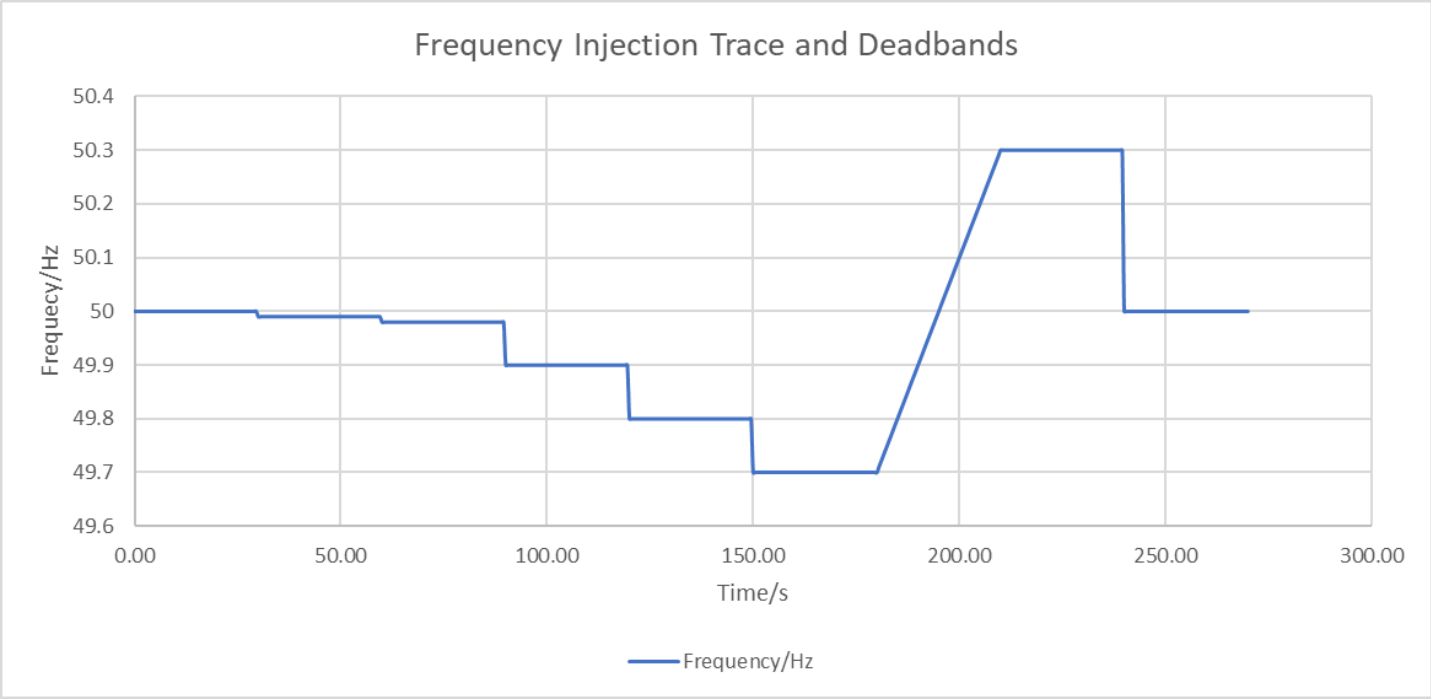
Step	Action	Description	Examples
2	Overall response values should be copied into the Tool.	The Tool assumes that the response looks like generation i.e. Low frequency = generation increase. High frequency = generation decrease Check response values are +ve or -ve accordingly.	
Populate Excel Analysis Tool			
3	General	Green cells can be edited. Timings/ranges may need to be altered depending on the injection profile used.	
4	Clear previous test data	In the Test 1.1, 1.2, 2.1, 2.2 and Test 3 data tabs, delete the previous data from ‘Frequency’ and ‘Active Power’ columns.	

Step	Action	Description	Examples
5	**Test 1.1 and 1.2** Input the Contracted response in the green cell under the test 1.1 tab Maximum Contracted Response Input the data for Test 1	Units in this table should be the same as those in the measured test data. Note: High Frequency response values should be negative. If testing for only HF/LF then set the other value to 0MW. For Test 1.2 Maximum Contracted response value should have been carried over from Test 1.1.	 Maximum Contracted Response/MW High Frequency 100 Low Frequency 100  Time/s, Frequency/Hz, Active Power/MW 0.1, 50, 0 0.2, 50, 0 0.3, 50, 0 0.4, 50, 0
6	Input the time when the change in frequency is supposed to occur	If the frequency changes occur at times different than the example trace given in the guidance input, this value can be changed under 'when does the frequency step occur' on the tab for each test.	 When does the frequency step occur? 30
7	**Test 2.1 and 2.2** Enter data in the same way as for Test 1. Check time used for each	Maximum Contracted response value should have been carried over from Test 1.1	 Time/s, Frequency/Hz, Active Power/MW 0.5, 50, 0 1, 50, 0 1.5, 50, 0 2, 50, 0

Step	Action	Description	Examples
	sub-test (a-f) aligns with test data		

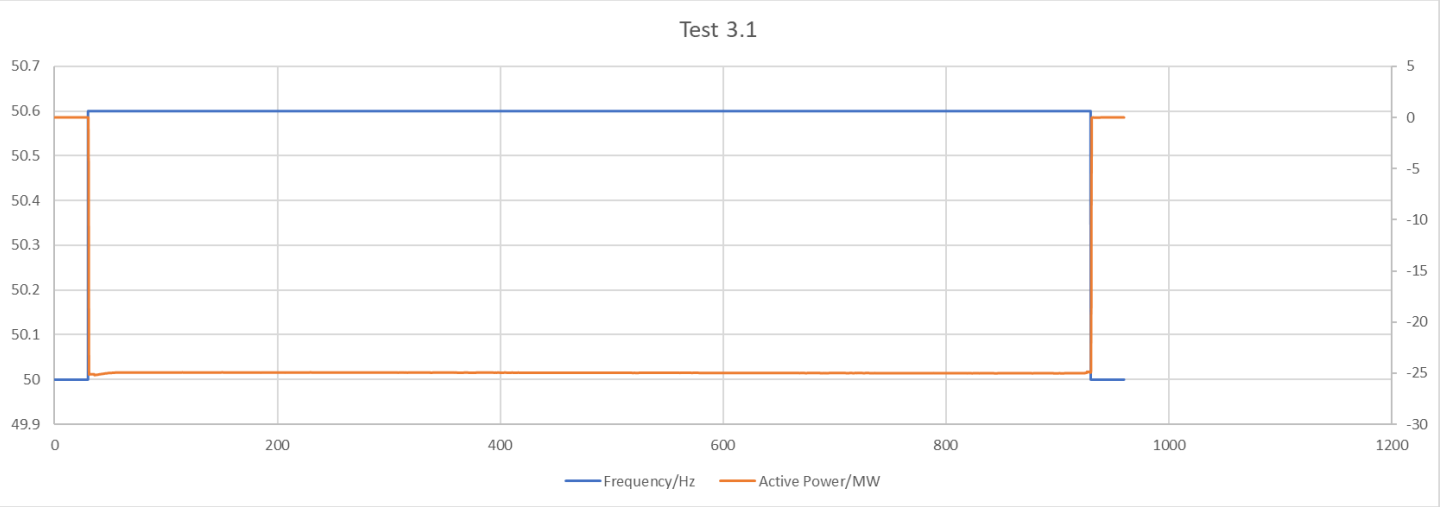
	When do the Frequency Steps occur
a	30
b	60
c	90
d	120
e	150
f	180

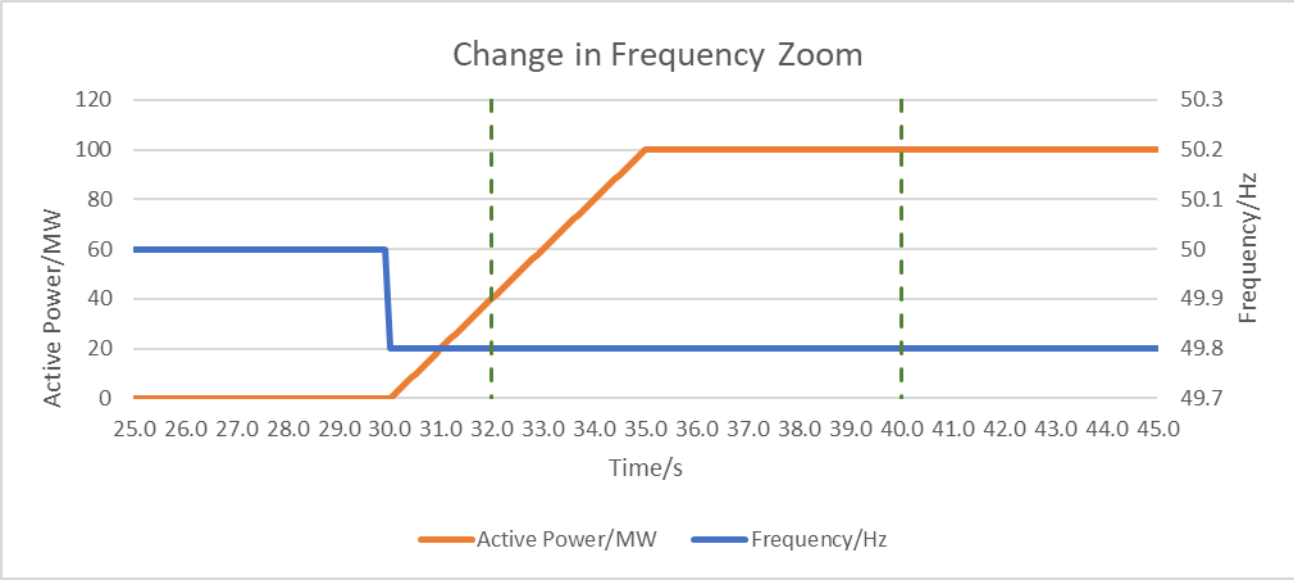
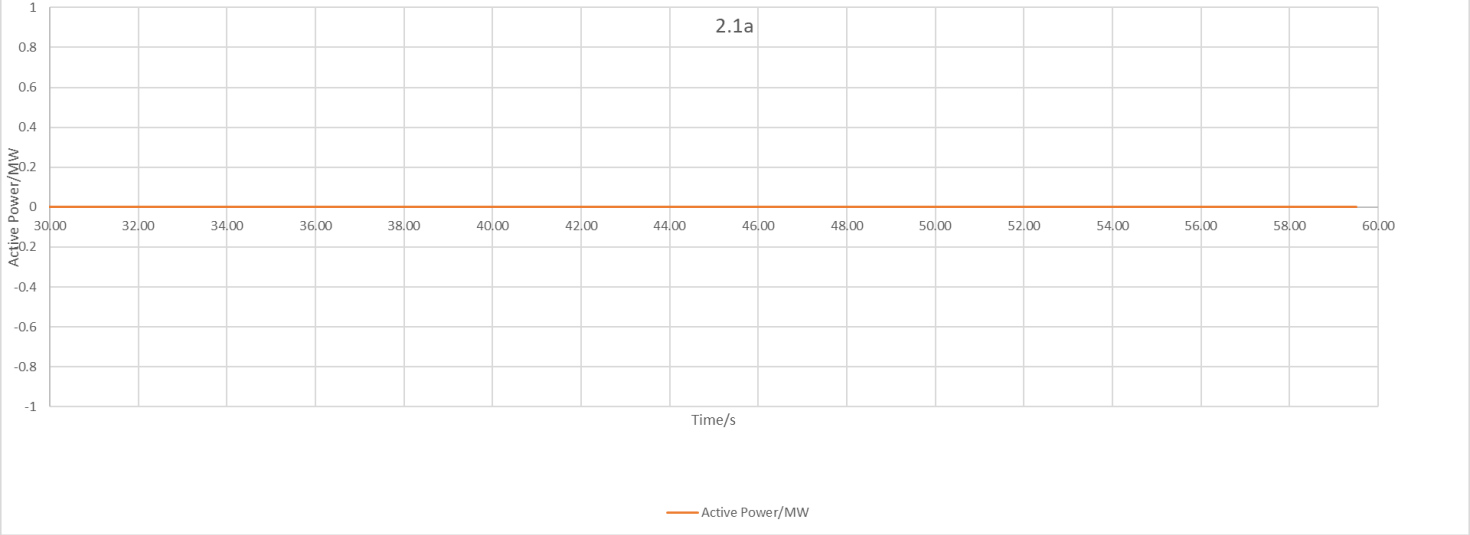
Step	Action	Description	Examples
8	Check the frequency trace graphs appears as expected		

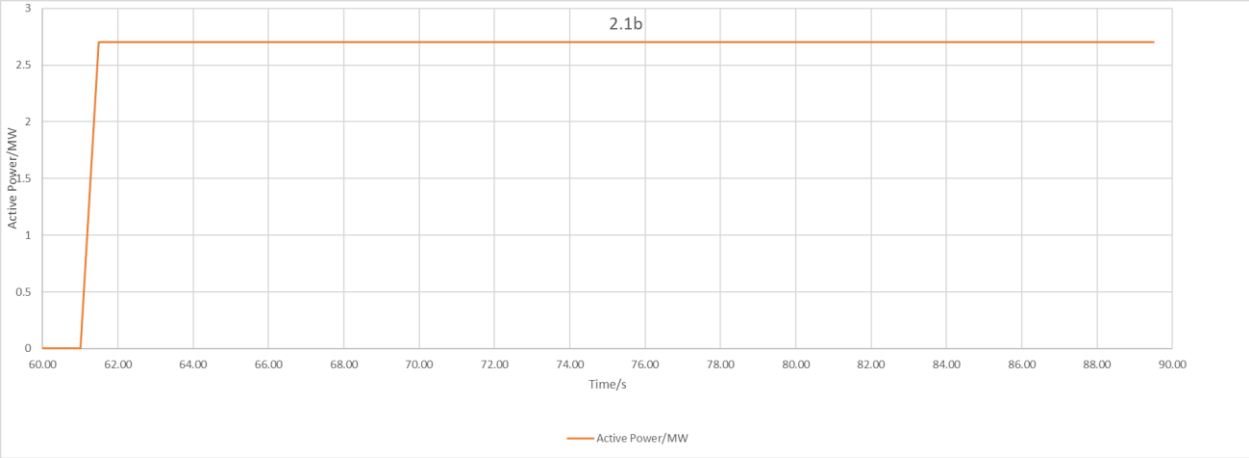
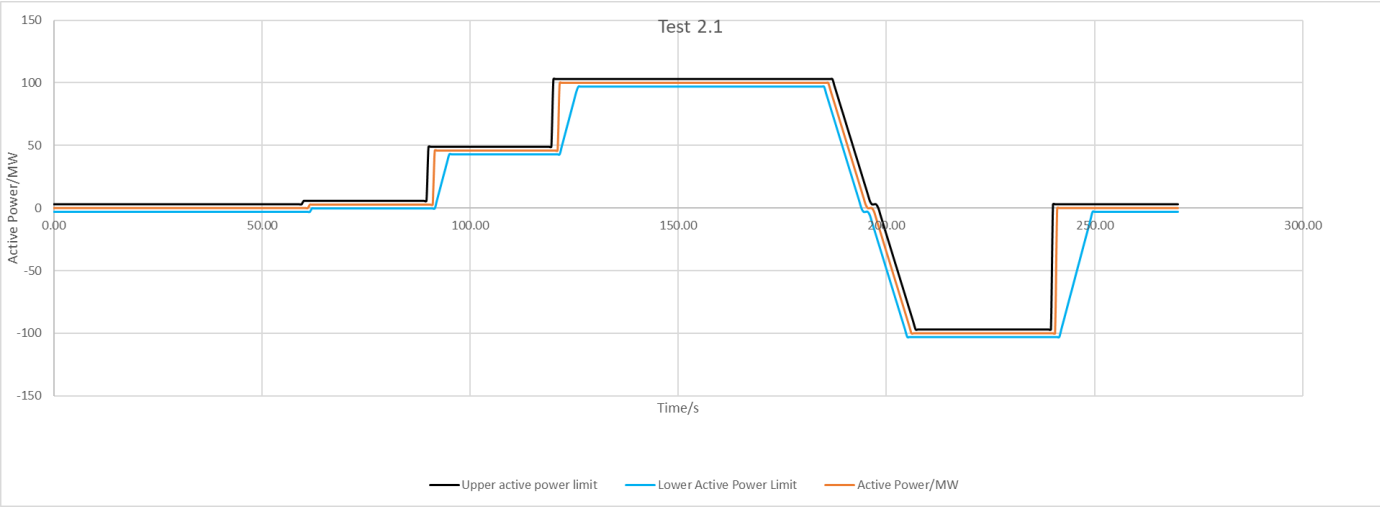


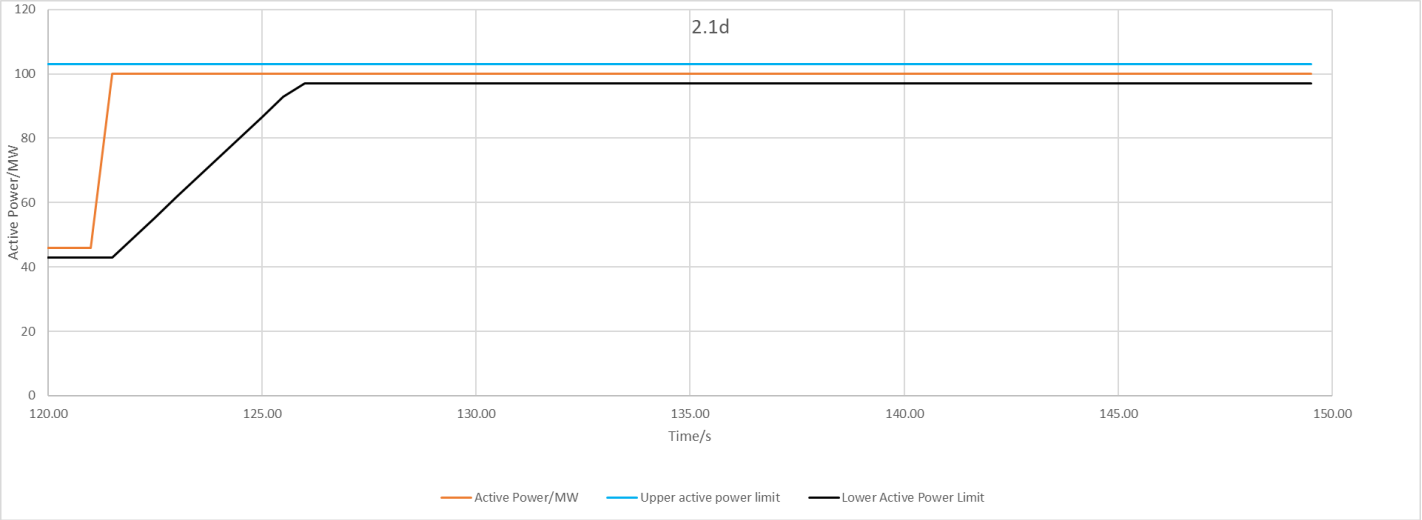
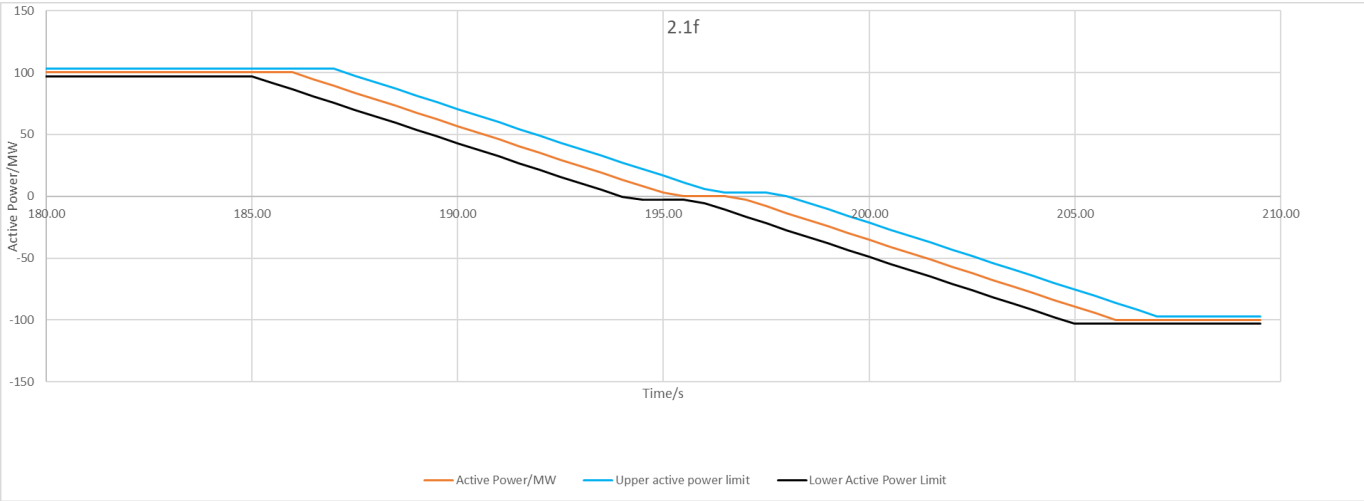
Step	Action	Description	Examples
9	**Test 3**		

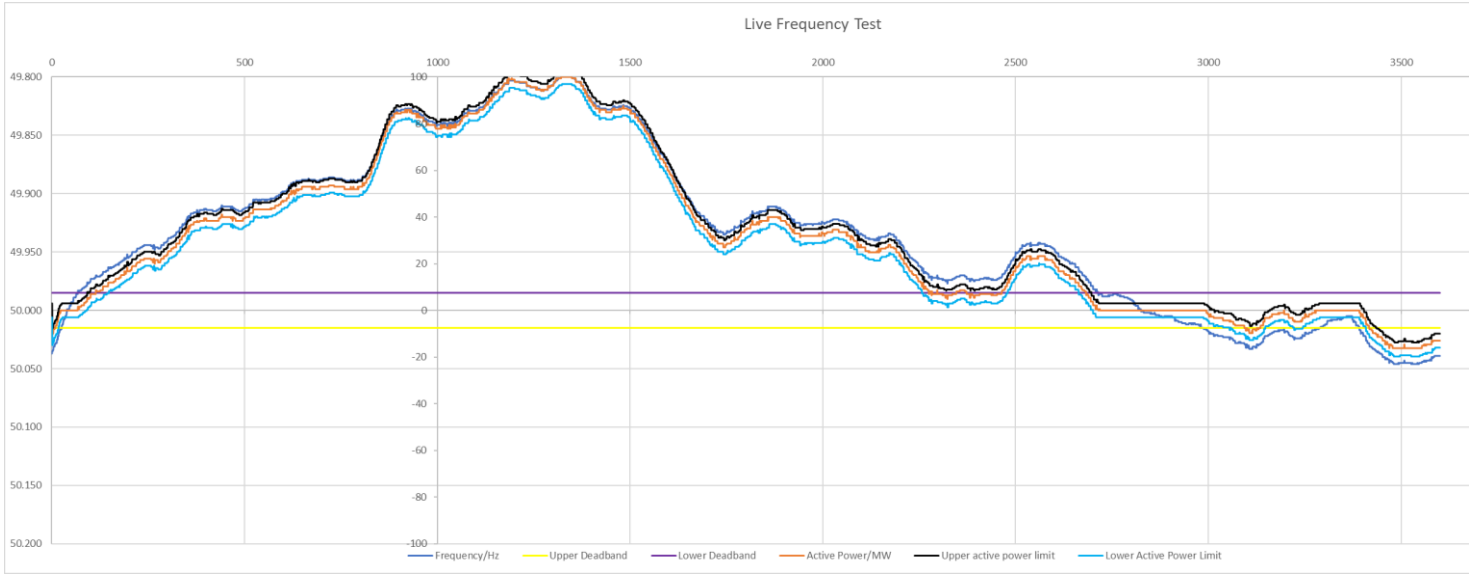
Time/s	Frequency/Hz	Active Power/MW
0	50.037	-11.35135135

Step	Action	Description	Examples
	Input data on the appropriate tab		0.05 50.037 -11.35135135 0.1 50.035 -10.27027027 0.15 50.035 -10.27027027 0.2 50.035 -10.27027027
Analyse Results against pass criteria.			
10	**Test 1.1 and Test 1.2** Check on graphs that response is sustained for 60 minutes (3600 seconds)	Note that for Single Assets to be assessed as part of an aggregated facility simply note how long the response was sustained for.	
11	Check the minimum response achieved constitutes the volume of the DR unit and the standard deviation is <2.5% of the expected active power	Note that for Single Assets to be assessed as part of an aggregated facility simply record the minimum response within the timescale.	Minimum of Sampled Values: 100.00000 Standard Deviation: 0.00000

Step	Action	Description	Examples
12	Check that for each of Test 1.1 and Test 1,2 a response to a change in frequency occurs by 2 seconds and the maximum contracted response is delivered by 10 seconds Check that this response monotonically progresses	Dotted green line are added automatically at t+2 and t+10. A change in frequency should start before the first line and achieve maximum response by the second line. This criterion should only be assessed until the required response is achieved.	
13	**Test 2.1a and Test 2.2a** Check there is no response within the deadband	Where there are any non-zero values these need to be explained by the ITE in the test report using the comments field.	

Step	Action	Description	Examples
14	**Test 2.1b and Test 2.2b** Check that A noticeable change in power in the correct direction is observed	.	
15	**Tests 2.1c-e and Tests 2.2c-e** The active power response is proportional. Also, the minimum response should be assessed against the contracted delivery volume Active power response should also be within the allowed tolerances	Orange line should remain within black and light blue lines. It may be easier to use sub-test graphs to check active power remains within limits as required.	

Step	Action	Description	Examples
			
16	**Test 2.1f and Test 2.2f** Check the active power response stays within limits during the test and reaches the maximum response where required.	Orange line should remain within black and light blue lines. It may be easier to use sub-test graphs to check active power remains within limits as required.	

Step	Action	Description	Examples
17	**Test 3**	Check the active power response is consistent with the expected active power.	
Test Report			
18	Write report giving feedback on test results.	See report template	Testing Guidance Appendix E