POWER SYSTEM FREQUENCY AND TIME ERROR MONITORING

October 2012

PREPARED BY: System Performance and Commercial

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Contents

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2 Introduction

AEMO must use reasonable endeavours to maintain the power system frequency and time error within the limits specified in the Frequency Operating Standards determined for the Mainland and the Tasmania Region by the Reliability Panel. This document reports on the frequency and time error performance observed during October 2012 in all regions of the NEM. Queensland, New South Wales, Victoria and South Australia are referred to as the Mainland regions throughout the report.

The Frequency Operating Standards for the Mainland regions and the Tasmania region are available on the AEMC web site[1].

The "Power System Frequency and Time Deviation Monitoring Report – Reference Guide[2]" outlines the calculation processes used by AEMO in the preparation of the monthly Power System Frequency and Time Deviation Monitoring reports.

The analysis of the delivery of Slow Raise service, Slow Lower service, Delayed Raise service and Delayed Lower service presented in this report are based on 4-second definition data. Unless otherwise noted, frequency data for Mainland regions is sourced from 4-second measurements in New South Wales and frequency data for Tasmania region is sourced from 4-second measurements in Tasmania. The analysis of Fast Raise service and Fast Lower service delivered is based on high-speed (50 millisecond or higher definition) data from Market Participants and is only presented in this report for events where the appropriate data is available.

3 Operation within the Normal Operating Frequency Band

During October 2012 the Mainland frequency was within the Normal Operating Frequency Band (49.85 Hz – 50.15 Hz) 99.98% of the time.

During October 2012 the Tasmanian frequency was within the Normal Operating Frequency Band 99.75% of the time.

All frequency excursions within the Normal Operating Frequency Excursion Band (49.75 Hz – 50.25 Hz) returned to the Normal Operating Frequency Band within the times in the Frequency Operating Standards.

4 Operation outside the Normal Operating Frequency Excursion Band

Table 1 summarises events in the Mainland and Tasmanian regions for the month October 2012 with frequency excursions outside the Normal Operating Frequency Excursion Band.

All Mainland events in Table 1 returned to the Normal Operating Frequency Excursion Band within the times in the Mainland Frequency Operating Standard.

One Tasmanian event in Table 1 did not meet the Tasmania Frequency Operating Standard. This event is discussed in Section 6.

[1] The Frequency Operating Standards for the Mainland and Tasmania regions are available from http://www.aemc.gov.au/Panels-and-Committees/Reliability-Panel/Guidelines-and-standards.html
[2] The Power System Frequency and Time Deviation Monitoring Report – Reference Guide is available from http://www.aemo.com.au/Electricity/Market-and-Power-Systems/NEM-Reports/Power-System-Performance-Monitoring

5 Events outside Normal Operating Frequency Excursion Band

Table 1: Events in the Mainland and Tasmanian regions with frequency excursions outside the Normal Operating Frequency Excursion Band.

EVENT	LOW/HIGH FREQUENCY EVENT	NUMBER OF EVENTS	
		MAINLAND	TASMANIA
No contingency or load event/Normal event	LOW	0	1
	HIGH	0	0
Load Event	LOW	0	48
	HIGH	0	50
Generation Event	LOW	1	2
	HIGH	0	0
Network Event	LOW	0	0
	HIGH	0	0
Separation Event	LOW	0	0
	HIGH	0	0
Multiple Contingency Event	LOW	0	0
	HIGH	0	0

6 Events that did not meet the Frequency Operating Standards

In this section, details are provided of those events identified as not meeting the Frequency Operating Standard applicable to each event.

6.1 Events in Mainland regions

There were no low or high frequency events recorded in the Mainland region that did not meet the Mainland Frequency Operating Standard during October 2012.

6.2 Events in the Tasmania region

There was one frequency event recorded in the Tasmania Region that did not meet the Tasmania Frequency Operating Standard during October 2012. This event is listed in Table 2.

Table 2: Frequency events in the Tasmania region during which frequency exceeded the Tasmania Frequency Operating Standard.

DATE	EVENT	MIN/MAX FREQUENCY (HZ)	TIME OUTSIDE NORMAL OPERATING BAND (49.85 HZ - 50.15 HZ)(SECONDS)
21/10/2012 13:54:00	No contingency causing the event could be identified.	49.68	137

6.2.1 Event: 21/10/2012 13:54:00

No contingency could be identified as the cause of the event on 21 October 2012 in Tasmania. There was an un-forecasted 80 MW decrease in generation from the non-scheduled Woolnorth Wind Farm, which exceeded the capacity of the 50 MW enabled Raise Regulation FCAS. Basslink was not transmitting power at the start of this event. Figure 1 shows that between 1354 hours and 1400 hours the Tasmania frequency was outside the Normal Operating Frequency Band for 137 seconds, and fell to a minimum of 49.68 Hz.

While the enabled Fast Raise and Slow Raise FCAS delivered sufficient power to return the frequency to the Normal Operating Frequency Band during this event, four generating units operating below target during Dispatch Interval (DI) ending 1400 hours contributed to additional frequency excursions outside the Normal Operating Frequency Band over the DI.

A comparison of the amount of Enabled Slow Raise FCAS, and the amounts delivered is shown in Figure 2. The amount of Fast Raise services delivered was not calculated as high speed data was not requested for this event. The frequency did not depart the Normal Operating Frequency Band for a sufficient time to evaluate the performance of Delayed Raise FCAS.

Figure 1 also shows frequency excursions at 1401 hours and 1406 hours. These frequency excursions are Basslink switching events, and are consistent with the Tasmania Frequency Operating Standard.

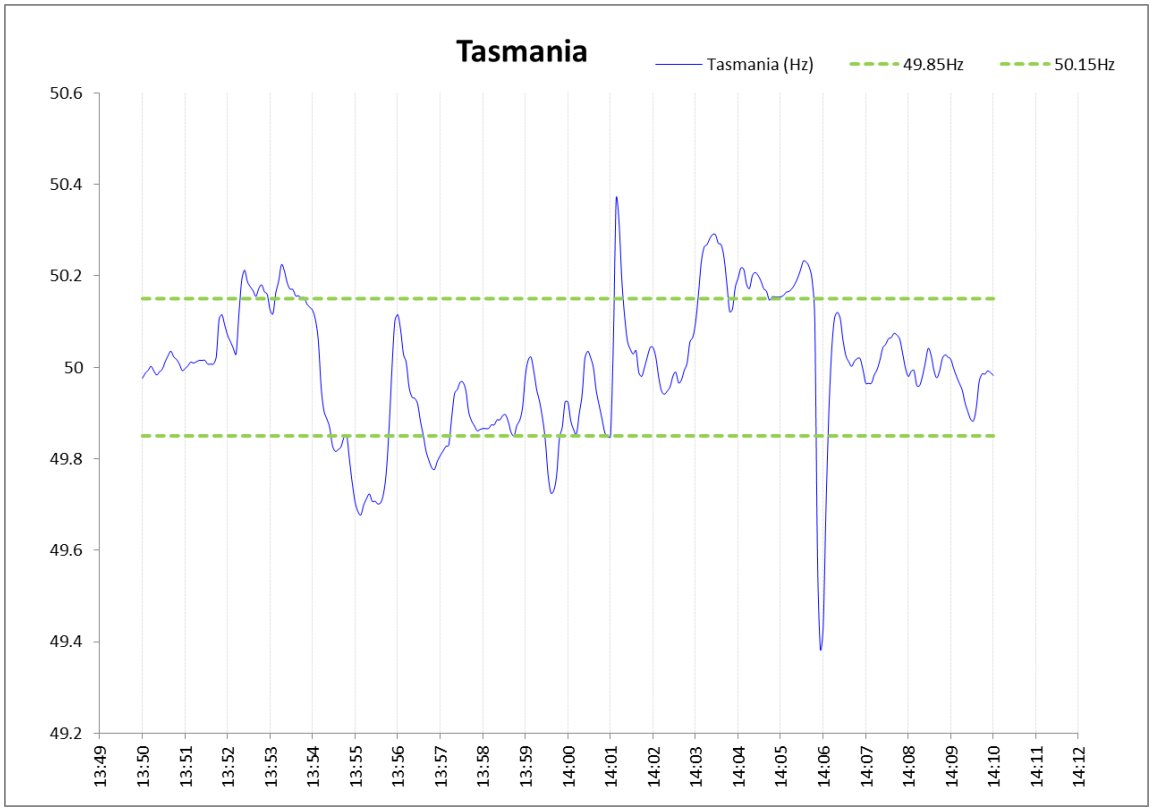

Figure 1 No contingency event in Tasmania that occurred 24/10/2012 13:54:00

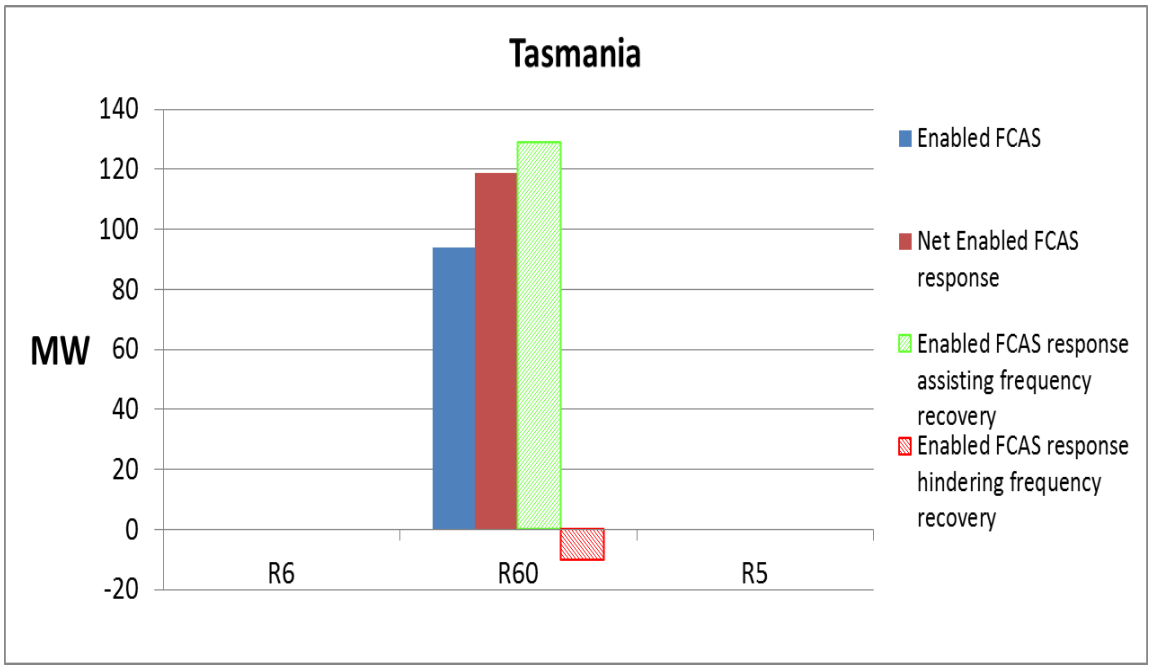

Figure 2: FCAS response to no contingency event in Tasmania that occurred 21/10/2012 13:54:00.

7 Accumulated time error

The Frequency Operating Standards require that the accumulated time error be maintained within the range ± 5 seconds in Mainland regions and ± 15 seconds in Tasmania. Constraints used to control Mainland accumulated time error, by varying the amount of Regulation FCAS enabled, are based upon measurements taken in Queensland and New South Wales. The range of accumulated time error recorded for measurements in Queensland, New South Wales and Tasmania are provided in Table 3.

Table 3: Accumulated time error measurements in October 2012.

VALUE	QLD	NSW	TAS
Highest positive time error (seconds)	3.62	3.86	11.55
Lowest negative time error (seconds)	-3.28	-3.03	-7.14